NOTE

This Microfiche meets the quality requirements of the American National Standard for Microfiche of Documents (ANSI PH5.9-1975). However, because of imperfections in the document from which it was made, it contains images that are illegible or difficult to read. The source document for this microfiche is the best copy that could be obtained prior to filming.

CIS

Congressional Information Service
Washington, D.C.

Calendar No. 427

101st Congress, 1st Session | SENATE | Report 101-228

CLEAN AIR ACT AMENDMENTS OF 1989

REPORT

OF THE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS UNITED STATES SENATE

together with

ADDITIONAL AND MINORITY VIEWS

TO ACCOMPANY

S. 1630

December 20, 1989.—Ordered to be printed

U.S. GOVERNMENT PRINTING OFFICE
24-525 WASHINGTON : 1989

S323-4

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, DC 20402

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

QUENTIN N. BURDICK, North Dakota, *Chairman*

DANIEL PATRICK MOYNIHAN, New York
GEORGE J. MITCHELL, Maine
MAX BAUCUS, Montana
FRANK R. LAUTENBERG, New Jersey
JOHN B. BREAUX, Louisiana
HARRY REID, Nevada
BOB GRAHAM, Florida
JOSEPH I. LIEBERMAN, Connecticut

JOHN H. CHAFEE, Rhode Island
ALAN K. SIMPSON, Wyoming
STEVE SYMMS, Idaho
DAVE DURENBERGER, Minnesota
JOHN W. WARNER, Virginia
JAMES M. JEFFORDS, Vermont
GORDON J. HUMPHREY, New Hampshire

DAVID M. STRAUSS, *Staff Director*
ROBERT F. HURLEY, *Minority Staff Director*

CONTENTS

Page

General statement 1

Discussion of provisions:

Title I—Attainment and maintenance of ambient air quality standards:

- Introduction 5
- Designation of areas (section 101) 13
- Enhanced monitoring and inventories (section 102) 16
- Transportation guidance (section 103) 18
- General planning requirements (section 104) 19
- Federal facilities (section 105) 23
- General provisions for nonattainment (section 106) 23
- Additional requirements for ozone nonattainment areas (section 107) 30
- Additional requirements for carbon monoxide nonattainment areas (section 108) 52
- Additional requirements for PM-10 nonattainment areas (section 109) 68
- Interstate pollution (section 110) 75
- Outer continental shelf activities (section 111) 76
- Indian tribes (section 112) 78
- Miscellaneous and conforming amendments (section 113) 80
- Secondary standards (section 114) 81

Title II—Mobile source controls:

- Introduction 82
- Emission standards for certain motor vehicles (section 201) 88
- Carbon monoxide emissions at cold temperatures (section 202) 92
- Control of vehicle refueling emissions (section 203) 93
- Evaporative emissions (section 204) 94
- Onboard emission diagnostic systems (section 205) 96
- Emissions of carbon dioxide from passenger cars (section 206) 98
- Low-polluting vehicles (section 207) 101
- Light duty vehicle useful life (section 208) 102
- Warranties (section 209) 102
- Non-road engines (section 210) 103
- Prohibition on production of engines requiring leaded gasoline (section 211) 105
- Motor vehicle testing and certification (section 212) 106
- In-use compliance—recalls (section 213) 107
- Fuel volatility (section 214) 109
- Desulfurization (section 215) 110
- Lead phasedown (section 216) 112
- Fuel quality (section 217) 116
- Oxygenated fuels (section 218) 118
- Misfueling (section 219) 120
- Urban buses (section 220) 121
- Enforcement (section 221) 122
- Consideration of Federal transportation and environmental policies (section 222) 127

Title III—Air toxics:

- Background discussion 127
- Hazardous air pollutants (section 301) 147
- Marine manufacturing (section 302) 202
- Dual regulation of radionuclides (section 303) 203
- Prevention of sudden, accidental releases (section 304) 205
- Municipal waste combustion: Air emissions (section 306) 251
- Municipal waste combustion: Ash disposal (section 307) 257

Page
Discussion of provisions—Continued
  Title III—Air toxics—Continued
    Consultation (section 308) 260
  Title IV—Acid deposition control:
    Background 261
    Acid deposition control (section 401) 302
    Repeal of percent reduction (section 402) 337
    Federal facilities (section 403) 338
    Acid deposition standard (section 404) 341
    National acid lakes registry (section 405) 344
    Industrial sulfur dioxide emissions (section 406) 344
    Sense of the Congress on emission reduction costs (section 407) 345
    Continuation of the Acid Deposition Assessment Program (section 408) 345
  Title V—Permits:
    Introduction 346
  Title VI—Enforcement and reauthorization:
    Introduction 357
    Section 113 enforcement (section 601) 358
    Reviewability of administrative orders (section 602) 366
    Compliance certification (section 603) 368
    Contractor inspections (section 604) 369
    Administrative enforcement subpoenas (section 605) 369
    Emergency orders (section 606) 370
    Contractor listings (section 607) 371
    Judicial review pending reconsideration of regulation (section 608) 372
    Citizen suits and petitions (section 609) 372
    Enhanced implementation and enforcement of new source review requirements (section 610) 376
    Movable stationary sources (section 611) 376
    Authorizations (section 612) 376
  Title VII—The Stratospheric Ozone and Climate Protection Act:
    Introduction 377
Hearings 402
Markups 402
Rollcall votes 402
Evaluation of regulatory impact 403
Cost of legislation 403
Additional views of:
  Senator Mitchell 404
  Senator Lautenberg 406
  Senator Simpson 410
  Senator Warner 412
Minority views of Senator Symms 415
Changes in existing law 489

Calendar No. 427

101st Congress *1st Session*	SENATE	Report 101-228

CLEAN AIR ACT AMENDMENTS OF 1989

December 20, 1989.—Ordered to be printed

Mr. Burdick, from the Committee on Environment and Public Works, submitted the following

REPORT

together with

ADDITIONAL AND MINORITY VIEWS

[To accompany S. 1630]

The Committee on Environment and Public Works, to which was referred the bill (S. 1630) to amend the Clean Air Act to provide for attainment and maintenance of health protective national ambient air quality standards, and for other purposes having considered the same, reports favorably thereon with an amendment and recommends that the bill as amended do pass.

GENERAL STATEMENT

The Clean Air Act is the first modern environmental law to be enacted. It was first signed into law by President Johnson in 1963, replacing previous Federal air pollution legislation. In 1965 hearings before the Special Subcommittee on Air and Water Pollution, the Assistant Secretary of the Department of Health, Education, and Welfare testified:

> [S]erious air pollution problems aris[e] from the ever-increasing use of motor vehicles, [and] our rising demands for the energy derived from burning of sulfur-bearing fuels . . . The national importance of resolving these problems is beyond dispute. They are among the most significant factors in the growing and worsening air pollution problems currently faced by thousands of American communities . . .

> None of these problems is technologically insurmountable. Our current technical capacity for dealing with them admittedly varies from one problem to another, but even where our knowledge and skills are less refined than we would wish, there exist at least partial solutions which we would have a responsibility to evaluate as rapidly as possible and to apply where feasible. (Hearing of April 6, 1965, page 22.)

This statement is still true today. Although some areas of the country have improved their air quality since 1965, a majority of Americans are still breathing air that does not meet the Federal health-based air quality standards.

Our knowledge about the adverse effects of exposure to air pollution has increased since 1965. Researchers have demonstrated adverse effects at levels of exposure previously presumed to be safe. Illnesses of no traumatic origin are now linked to air pollution. In some areas, for example, residents who do not smoke may have lungs as damaged as the lungs of heavy smokers, due to exposure to air pollution.

Air pollution can silently damage our lungs and heart or act swiftly in the case of exposure to toxic air pollutants. Rigorous regulation of toxic air pollutants is needed to avoid risk of serious, irreversible damage to human health.

We are routinely exposed to thousands of different air pollutants emitted every day. Exposure to this mix of pollutants can produce more adverse health effects than exposure to each of the individual pollutants. These synergistic effects must be considered if we are to adequately protect public health. In addition, there are many pathways of exposure to hazardous pollutants and contaminants. Exposure to polluted outdoor and indoor air, contaminated water and soil can combine to produce greater risks than exposure through only one source.

In testimony before the Subcommittee on Environmental Protection, public health leaders acknowledged the continuing health threat posed by air pollution. The American Lung Association, the American Public Health Association and the American Academy of Pediatrics all testified that we are facing a public health crisis due to air pollution. Reductions in emissions of sulfur dioxide and oxides of nitrogen are warranted based on health considerations alone. This conclusion does not address the myriad of other pollutants of concern. With regard to a graph of ozone pollution in the Northeast States for 1987 and 1988, one researcher from the American Lung Association stated:

> . . . Most States went up significantly between 1987 and 1988 and Massachusetts tripled its ozone violation days up to 28 for that particular summer of 1988. Maine and New Hampshire tripled their violation dates in one year. Vermont appears on the graph for the first time in 1988. I consider this graph frightening, hair-raising, and truly a crisis.

A Harvard researcher testified before the Subcommittee that "In every epidemiologic investigation that we have performed over the past 6 years, we have repeatedly found a 2 to 5 percent air pollution effect on human mortality and morbidity. We find it very difficult to reject these consistent findings . . ." (June 17, 1987).

In a separate study, the past President of the American Public Health Association found that ". . . air pollution is one of the greatest risks to public health in the United States. Its causes, contributes to, or aggravates a long list of disease and dysfunction—chronic bronchitis, lung cancer, nervous disorders and heart disease. As many as 50,000 premature deaths may be caused by single air pollutants or a combination of pollutants." He further clarified his points by saying that "If further Congressional action, or voluntary action by polluters, is not taken to reduce human exposure to a broad range of toxic air pollutants, then we can expect substantial increases in the incidence of air-pollution provoked disease, dysfunction, and premature deaths. A two- to three-fold (at least) incease, or 100,000 to 150,000 premature deaths per year would not be an unrealistic estimate. It is in fact a most conservative estimate."

The health problem is serious and it is pervasive. There is no choice but to breathe the air, whether it is clean or polluted. Air is inhaled regardless of its quality. This is a national resource that should be protected as our parks and national monuments are protected.

To protect this resource a strong national control strategy is needed. Air pollution recognizes no State or international borders. Aggressive controls in downwind areas will do little to improve air quality if the quality of air entering the region is poor. Because States have limited resources and many additional responsibilities, both the State and Federal Government should work together to assure implementation of programs that improve air quality.

Recent History.—Since the enactment of the original Clean Air Act and the Clean Air Act Amendments of 1977, issues relating to air quality continue to require Congressional action and concern.

Attainment of the health-based air quality standards has proven more difficult than anticipated in the 1977 Amendments. Although most areas of the country were to have attained the standards for ozone and carbon monoxide by 1983, in 1989, over half of the population of the United States is still exposed to levels of air pollution considered unhealthful by the Envronmental Protection Agency and medical researchers. New and disturbing evidence on the health effects of ozone and carbon monoxide indicates that the current standards may not be adequate to protect the public health.

Very little has been done since the passage of the 1970 Act to identify and control hazardous air pollutants. In the nineteen year history of the Clean Air Act, just eight substances have been listed as hazardous air pollutants: asbestos, beryllium, mercury, vinyl chloride, radionuclides, inorganic arsenic, benzene, and coke oven emissions. NESHAPS (National Emission Standards for Hazardous Air Pollutants) have been promulgated for sources of only seven of these pollutants. Meanwhile the States collectively have regulated over 700 hazardous air pollutants.

There is no credible dispute that acid rain is a major contributor to the burden of ill health and environmental damage in the United States. Reputable authorities, publishing their results in peer-review scientific journals, have concluded that acid rain and its precursors are responsible for between 50,000 and 70,000 premature deaths per year. In addition acid deposition is responsible for massive damage to buildings and other man-made structures, poisoning lakes and stream to the extent that they no longer can support fish and other life, altering the chemical composition of soils and upsetting the natural balance which enables their productive use, and reducing visibility throughout the United States.

During the last decade, the Committee on Environment and Public Works has reported legislation addressing all of these issues. During the 1980's, the Committee continued its efforts to devise legislation that would reduce acid precipitation levels, bring about attainment of the air quality standards, and control toxic air pollutants. Bills were introduced and reported by the Committee to the Senate three times, but none has been enacted.

In 1982, the Committee reported acid rain legislation by a vote of 15-1. The reported bill required an 8 million ton reduction in sulfur dioxide by 1995. These reductions were required in a 31-State region east of the Mississippi River.

In 1984, the Committee again reported acid rain legislation which required a 10 million ton reduction in sulfur dixoide emissions by 1994. As in 1982, the reduction requirement affected only the 31 States east of the Mississippi.

The last bill to be reported by the Committee was S. 1894 in November, 1987. The five title proposal contained provisions on ozone and carbon monoxide nonattainment, acid rain and clean coal technology, mobile sorces, ambient air quality standards, hazardous air pollutants and incinerator standards. The bill's acid title required a national 12 million ton reduction in sulfur dioxide emissions by 1998. Despite efforts to develop an acceptable compromise, the Senate did not act on comprehensive clean air legislation before the 100th Congress adjourned in October of that year.

As with acid, rain, the Committee reported comprehensive legislation on nonattainment and air toxics in 1982, 1984 and 1987. In November of 1982, after 27 hearings and 33 markups, the Committee reported S. 3041, the Clean Air Amendments of 1982.

In May of 1984 the Committee reported S. 768, the Clean Air Act Amendments of 1984. A total of nine days of hearings was held on S. 768.

In November of 1987, the Committee reported S. 1894, the Clean Air Standards Attainment Act of 1987, after 13 days of hearings and 9 days of mark-up.

S. 1630, the Clean Air Amendments of 1989, reflects the advances in our knowledge of the health effects, sources, and controls of air pollution. It builds on over a decade of careful study and consideration of the air pollution problems facing the country. It incorporates new areas of concern, such as chlorofluorocarbons, whose impact was virtually unknown a decade ago and which we now know depletes the Earth's protective ozone layer. Its goal is to protect, as a national resources, the very air that all of us rely on for our daily existence.

DISCUSSION OF PROVISIONS

TITLE I—ATTAINMENT AND MAINTENANCE OF AMBIENT AIR QUALITY STANDARDS

INTRODUCTION

Background.—The goal of the Clean Air Act is to "protect and enhance the quality of the Nation's air resources." The Act distinguishes between two types of air pollutants (causing death or serious illness at low levels) which are addressed in title III of the bill and "criteria" pollutants (so-called because under section 108 of the Act EPA must issue criteria documents identifying the effects of each pollutant).

Criteria pollutants are defined as those pollutants that come from numerous or diverse sources and whose presence "may reasonably be anticipated to endanger public health or welfare". Section 109 of the Act requires EPA to establish for each criteria pollutant a national ambient air quality standard that is a uniform, nationwide standard.

As defined in the Act, "primary" ambient air quality standards limit the maximum allowable concentration of each criteria pollutant to the level that "protects the public health" with an "adequate margin of safety", without regard to the economic or technical feasibility of attainment. This means identifying through research the lowest level at which health effects are observed and applying a margin of safety to arrive at the ambient standard. Secondary standards are established to protest against adverse impacts on welfare, including impacts on visibility, vegetation, animals, wildlife, materials and property. The States, together with EPA, are responsible for ensuring that the primary air quality standards are met "as expeditiously as practicable", within the deadlines specified in the Act. The secondary standards are to be attained in a "reasonable" period of time.

The six criteria pollutants for which EPA has established ambient standards are ozone, lead, sulfur dioxide, particulates, nitrogen dioxide, and carbon monoxide. Each ambient standard is based on a detailed review of scientific information contained in the criteria document that is prepared by EPA and expect advisers.

The lack of a program for regular reevaluation and revision of the original ambient standards led Congress, in the Clean Air Act Amendments of 1977, to mandate that the standards be, and revised if appropriate, by December 31, 1980, and at five-year intervals thereafter.

Two standards were promulgated before the end of 1980. A new standard was promulgated for airborne lead in 1978, and a revised ozone standard was published in 1979. However, both of these actions were stimulated, at least in part, by court litigation. The hydrocarbon (HC) standard was dropped in 1983. In 1985 the 1972 standards for nitrogen dioxide and carbon monoxide were reaffirmed. A revised particulate matter standard was promulgated in 1987. Final actions on revisions of the 1971 standard for sulfur dioxide are still pending, as are revisions of the 1978 standard for lead, and the 1979 standard for ozone. The Congressional mandate to reissue or revise ambient standards by December 31, 1980, and at five-year intervals thereafter is clearly not being met.

EPA has the authority to set ambient standards for additional pollutants and is considering establishing a new standard for acid aerosols. The Agency is currently in the process of preparing a criteria document on acid aerosols and estimates the process will take five years to complete.

Health effects of ozone.—The adverse health effects of exposure to ozone are well documented. Ozone is a strong oxidant formed by the interaction of hydrocarbons (also called volatile organic compounds, or VOCs), nitrogen oxides (NO_x), and sunlight. Ozone enters the body by way of the respiratory tract. Ninety percent of the ozone inhaled into the lung is never exhaled. Instead the ozone molecules react rapidly with the cells, fluids, and tissues that line the respiratory tract, irritating and inflaming the lungs.

Ozone is fatal at high concentrations. At lower concentrations found in many urban areas in the United States, extensive research has shown that healthy adults and children begin to exhibit adverse health effects. These include chest pains, shortness of breath, coughing, nausea, throat irritation, and increased susceptibility to respiratory infections.

Potentially more troubling and less well understood are the effects of long-term chronic exposure to summertime ozone concentrations found in many cities. Regular out-of-doors work or play during the hot, sunny summer months in the more polluted cities may cause biochemical and structural changes in the lung, paving the way for chronic respiratory diseases. A growing body of scientific evidence indicates that over the long term, chronic exposure to ozone may produce any accelerated aging of the lung analogous to that produced by cigarette smoke exposure. Ultimately, emphysema may result.

New evidence is also accumulating that the current ozone standard may not be sufficiently protective of public health. In one important test recently performed at EPA's research laboratory, 22 healthy individuals were exposed to 0.08 parts per million ozone for 6.6 hours, including five hours of moderate exercise. Respiratory function decreased with each succeeding hour of exposure. At the end of the exposure, it decreased by an average of seven percent, with one individual having a 26 percent reduction.

The Environmental Protection Agency has proposed and its Clean Air Scientific Advisory Committee has agreed, that the decreases in respiratory functions become adverse when the magnitude of the change exceeds ten percent. In EPA's study, seven of the 22 individuals crossed this threshold. EPA's results may indicate that the current air quality standard for ozone does not protect public health with the adequate margin of safety required by the Act.

EPA is currently in the process of revising the criteria documents for ozone based on this and other existing data. The adequacy of the one-hour standard and the need for a longer-term standard (six-to eight-hour time average) has been called into question. EPA anticipates it will take approximately two more years to resolve this issue.

The people most likely to be injured from exposure to ozone include the elderly, people with preexisting respiratory problems, children (who have a faster respiration rate and are thus more exposed), and approximately 20 percent of the population, called "responders," that has a markedly strong and unpredictable adverse reaction to ozone. The American Lung Association estimated that over 28 million pre-adolescent children, 17 million elderly, 6 million asthmatics, and 7 million persons with chronic obstructive pulmonary disease live in ozone nonattainment areas.

Health effects of carbon monoxide.—Exposure to carbon monoxide produces adverse health effects because carbon monoxide is more readily absorbed into the blood than is oxygen. As carbon monoxide displaces oxygen, bodily functions which depend on oxygen are threatened. This means that brain and fetal functions are particularly at risk.

At high CO levels death by asphyxiation results. At lower levels carbon monoxide pollution is especially harmful to fetuses and persons with heart disease. The fetal brain has high oxygen requirements. Health studies conducted on animals suggest that even modest levels of carbon monoxide pollution pose risks to fetal brain development and possible irreversible neural damages. The American Lung Association estimates that over 1.4 million pregnant women live in areas which have failed to attain the carbon monoxide standards.

Persons with heart disease are also susceptible to carbon monoxide pollution. A heart already weakened by pulmonary disease is particularly sensitive to the displacement of oxygen from the bloodstream by carbon monoxide because the circulatory system has limited capacity to transport oxygen throughout the body.

Healthy people may also suffer adverse effects from modest carbon monoxide exposure. As oxygen levels in the bloodstream decline and carbon monoxide levels rise, persons may suffer reduced aerobic capacity. As oxygen levels in the brain are reduced, individuals may experience loss of visual perception, manual dexterity, and cognitive functions.

Those particularly at risk with respect to carbon monoxide exposure are the elderly, fetuses, children, and those with existing heart disease.

Health effects of particulate matter.—High levels of small particulate matter (particulate matter less than 10 microns in diameter, called PM–10) can produce a range of effects from temporary reductions of lung function and increased respiratory symptoms to aggravation of existing respiratory and cardiovascular disease, cancer, and even premature death.

Certain types of PM–10 pose special health risks. One especially dangerous component of PM–10 is the carbon-based particles that result from incomplete combustion of fuel in diesel engines. EPA has concluded that these particulates, which are emitted in the exhaust of diesel trucks, buses, and other vehicles, may cause as many as 860 cancer cases annually. Particulates from wood stoves have similar hazardous characteristics.

Sulfates and nitrates, also called acid aerosols, are another dangerous type of particulates. These particulates are formed from emissions of sulfur dioxide and nitrogen oxides. Acid aerosols can sear sensitive lung tissues when inhaled. According to the Office of Technology Assessment, they could cause thousands of excess deaths each year. Even small dust particles can be hazardous, because they build up in the lungs over time and impair breathing capacity.

Children are especially vulnerable to PM-10 due to their higher respiratory rates and small lungs. A recent study in Utah found that hospital admissions for children with respiratory disease (pneumonia, pleurisy, and bronchitis) were three times higher than normal during months in which the Federal PM-10 standards were exceeded. Other vulnerable populations include the elderly, asthmatics, and victims of respiratory disease.

Health care costs.—The American Lung Association estimates that people in the United States spend $40 billion per year in additional health care costs due to exposure to air pollution. A study by the University of California released in July 1989 showed that in Southern California alone, decreased air pollution would save nearly $10 billion in annual health care costs. The study estimated that the health-care costs savings from Southern California's plan to meet the Federal air quality standards by the year 2003 would more than offset the plan's estimated $2.79 billion in pollution controls.

Welfare costs.—In addition, there are environmental and welfare effects of air pollution. Ozone pollution has been shown to cause extensive damage to many types of vegetation. EPA estimates that ozone pollution levels common in many areas can reduce tomato yields by 33 percent, beans by 26 percent, and soybeans by 20 percent. Other studies have shown that ozone levels below the Federal standard can cause wheat yields to drop by 30 percent.

According to the World Resources Institute, if ozone levels in agricultural regions were halved, the annual cost savings in crop loss would be on the order of $5.3 billion. U.S. wheat production would be boosted by $650 million (in 1987 dollars), soybean production by $3.4 billion, corn production by $880 million, and peanut production by $370 million. EPA has concluded that ozone causes annual crop losses of $2 to $3 billion per year.

Forests can also be damaged by this pollutant, but the damage to forests has not been quantified. Qualitatively, extensive damage and mortality from ozone have been demonstrated among pines in California and in the eastern United States. On high-elevation mountains in New England, most red spruce that showed significant needle loss in 1982 have since died. Fully 20 percent of the spruce alive in 1982 are now dead—a mortality rate eight times that at lower elevations. The stunted growth and 77 percent increase in mortality now showing up in commercial yellow pines in the Southeast may also reflect ozone air pollution at work.

Although quantification of these damages is more difficult than ascertaining the costs of pollution control equipment, billions of dollars each year would be saved from better protection of valued resources from ozone-induced damage, alone.

PM–10 pollution, especially PM–10 pollution less than 2.5 microns in diameter, impairs visibility. The National Park Service, for example, has reported that particulate pollution, especially fine sulfate particles, impairs scenic vistas within the national park system 90 percent of the time. PM–10 also soils materials and building surfaces. According to an EPA estimate, the damage is approximately $1 to $2 billion annually.

Clean Air Act history.—The 1970 and 1977 Clean Air Act Amendments established a partnership between the States and Federal government. EPA sets nationally uniform air quality standards and States, with the Agency's assistance, are responsible for meeting them. The requirement that the States develop State implementation plans (SIPs) and submit them to EPA for review allows for Federal oversight of the States' efforts to achieve and maintain the required level of air quality. In addition to the SIP process, the 1970 Clean Air Act established two mandatory control programs, one applying to new motor vehicles and the other to new stationary sources. EPA was responsible for setting standards for new motor vehicles. EPA also issues regulations for new stationary sources, called new source performance standards. The 1977 Amendments added three additional control programs, mandating ozone and carbon monoxide nonattainment areas to require retrofit controls on existing stationary sources, more stringent emissions limits on new stationary sources, and motor vehicle inspection and maintenance programs.

Primary and secondary standards for oxidants were first set by EPA in 1971. (Photochemical oxidants are a group of chemically related pollutants. From the standpoint of health and welfare effects, ozone is the most important of these pollutants.) In 1979 EPA revised the standard from total oxidants to the current definition of ozone only. Both the primary and secondary standards for ozone are currently defined as a daily maximum, one-hour average concentration of 0.12 parts per million (ppm), not to be exceeded more than once per year, on average. Areas exceeding this threshold are classified as nonattainment areas. EPA updates the nonattainment list annually, as data become available.

Identical primary and secondary standards for carbon monoxide (CO) were set in 1971 at levels of 9 ppm, 8-hour average, and 35 ppm, 1-hour average, neither to be exceeded more than once per year. These standards have been reviewed periodically by EPA and remain in place today.

In July 1987, EPA promulgated a modified ambient standard for particulate matter shifting the base for measurement from total suspended particulates (TSP) to particulates that are smaller than or equal to ten micrometers in size. This new standard is called PM–10 and replaces the old TSP standard. The modification was made as recent health effects documented that it is the smaller particulates, inhaled deeply into the lungs, that cause the primary threat to public health. Measurements of TSP could not reliably capture the extent of this threat, since larger particles have been the overwhelming portion of measured TSP (not the smaller particles capable of penetrating so deeply into lung tissue).

The smaller particles that are 10 micrometers or smaller are more likely to cause most of the adverse health effects because of their ability to reach the thoracic or lower regions of the respiratory tract. (One micrometer is one-millionth of a meter, or 1/25,000 of an inch. For comparison, the thickness of a human air is 100–200 micrometers.)

The revised PM–10 measurement establishes a 24 hour primary (health based) and secondary standard limit of 150 micrograms of PM–10 per cubic meter of air. In addition, an annual standard was set at 50 micrograms per public meter. The Agency concluded that these standards will protect the public health with an adequate margin of safety.

At the time the new PM–10 standard was established, 97 counties (or parts of counties) in the nation were not meeting the primary TSP standards and had been designated as nonattainment. Construction bans on new or modified major sources of TSP had been in place in some of these areas since 1979. EPA lifted those bans with the promulgation of the new PM–10 standard.

While accurate monitoring data is limited (due primarily to limited Agency and State resources), PM–10 pollution is pervasive. EPA has developed an analysis that classifies all counties into three groups based on their probability of not attaining the revised PM–10 standard. The first group includes, those with a very high probability of not immediately attaining the new standard (roughly seventy counties). A second group contains 110 areas where existing air quality data are not sufficient to determine if they are attaining but there is some possibility that they will not reach attainment without additional control measures. The third groups contains the remaining 3,000 counties which the Agency estimates should be in attainment and will not require additional control efforts.

In the Clean Air Act of 1970, Congress set 1975 as the deadline for meeting the primary air quality standards. The States were required to develop State implementation plans that would estimate the emissions reductions required to attain the ambient standards and establish the control programs to achieve the required reductions. In addition, section 111 of the Act required EPA to promulgate new source performance standards (NSPS) for new or modified stationary sources. To enforce the NSPS, the States were required to include construction permit programs in their SIPs.

By 1977, two years after the original deadline, 78 areas were still violating the ozone standard then in place (no more than one exceedance per year of a one-hour average oxidant concentration of 0.08 ppm). In 1977, the deadline for meeting the ozone and CO standard was moved back to 1982. Areas could show they could not meet the 1982 deadline were able to obtain an extension until 1987.

Responding to the failure to meet the goals of the 1970 Clean Air Act, the 1977 Amendments included a new and more aggressive control program. New SIPs were to be developed and submitted to EPA in 1979, and again in 1982, for areas seeking extensions of the attainment deadlines to 1987. A new schedule was established for limiting emissions from new motor vehicles. Existing stationary sources in nonattainment areas would have to retrofit with reasonably available emission controls. A new source could be constructed in a nonattainment area only if it would operate at the "lowest achievable emissions rate" and if emissions reductions could be obtained from other sources to offset the emissions from the proposed source. Transportation control measures would have to be considered. Severe nonattainment areas would have to implement automobile emissions inspection and maintenance programs.

In 1989, two years past the final deadline in the 1977 Amendments for all areas of the country to attain the CO and ozone health standards, 150 million people still live in areas which exceed one or both of those standards. The reasons for the failure to achieve healthy air are many. Among them are the understatement of emissions in inventories submitted by the States and approved by EPA; inadequacies in models used to predict ambient air quality; failure of States to implement some of the controls they had committed to in their SIPs; failure of some of the controls to achieve the projected emission reductions; and failure of EPA or the States to require additional controls when it became evident that the attainment deadlines would not be met.

The responsibility for the widespread failure to meet the ambient standards rests with both States (and local governments) and EPA. Predicting future air quality based on assumed control programs is a complicated undertaking that is susceptible to "paper" demonstrations of attainment that bear little relation to the likelihood of actual attainment. States had the responsibility to use the best data and analytical methods available in preparing emissions inventories and conducting modeling, and EPA had the responsibility for providing guidance of what constituted the best methods and carefully scrutinizing State submissions to assure that assumptions and analyses were consistent with the guidance.

In a January 1988 report the General Accounting Office (GAO) found in the three areas it studied—Houston, Los Angeles, and Charlotte, North Carolina—that assumptions used in models and inaccuracies in data exacerbated the uncertainties normally associated with models. This led to understating inventories of emissions and therefore the amount of emissions reductions needed to bring the areas into attainment. Both the States involved and EPA bear responsibility for these miscalculations.

In several areas controls that were included in a SIP were not implemented. For example, in New York and New Jersey Stage II programs that were called for in the SIPs were not implemented until courts (*not* EPA) ordered the States to fulfill the SIP commitments. An American Lung Association analysis conducted in 1986 found that in Los Angeles only three of 31 transportation and energy measures had been completed on schedule.

In some cases where control measures were implemented, they proved less effective than predicted, often because of lax enforcement. For example, the GAO study reported that EPA identified 13 plants in the Charlotte area in 1985 that were emitting more VOCs than regulations allowed. EPA also found that the county had granted variances to some operations without EPA approval.

Even when EPA identified problems in areas it often did little to require remedial action. For example, EPA discovered in 1985 that

Houston's demonstration of hydrocarbon emissions reductions needed for attainment was based on a faulty ratio of NOx to hydrocarbon emissions in the area. Rather than a 41 percent reduction, the new data showed that Houston needed a 71 percent reduction in hydrocarbons. EPA took no action to require Houston to revise its SIP, however, and instead waited to deal with the deficiencies in its generic nonattainment policy that was proposed in November of 1987.

Lack of resources at the Federal, State and local level has severely hampered implementation of the Act's requirements. During the decade of the 1980's, while the demands on EPA grew, appropriated funds for the air pollution program, as for other EPA programs, decreased both in nominal and real terms. States, which are required by the Act to impose permit fees to cover the costs of administering and enforcing permit programs, in many instances have not complied. Lack of resources led to preparation of inadequate and incomplete inventories, use of less costly—and less accurate—models, less frequent review and updating of inventories and other data on which control strategies are based, inadequate enforcement programs, and, at the Federal level, woefully inadequate oversight of, and technical assistance to, the States.

Lack of political will at all levels of government to implement difficult measures has also meant slower progress toward the attainment of healthy air. This is most clearly seen with respect to measures to reduce vehicle use in heavily polluted and heavily congested areas. The largest number of SIP provisions that were submitted and approved but that have not been implemented are provisions that call for transportation control measures. EPA's Office of Transportation and Land Use Policy was eliminated in 1982, and with its demise came the elimination of the requirement for States to report on the effectiveness of control measures and the ability of EPA to evaluate these measures. Federal transportation dollars have continued to finance programs and projects that have not been sufficiently reviewed for their potential adverse effects on air quality.

The nonattainment policy proposed by EPA in 1987 attempted to address many of the problems illustrated above, primarily by requiring better data and analyses to be used in SIP revisions, inclusion of milestones or interim measures of progress during the period before attainment, and better tracking and reporting of progress. EPA has not published a final policy, but many of the proposals were incorporated in legislation submitted to Congress by the President.

Nonattainment provisions of the bill.—The nonattainment provisions of the bill are based on more than 17 years of experience in trying to attain healthy air in all areas of the nation. The deadlines in the bill for attainment are realistic, with the ozone deadlines being the longest in recognition of the complexity of the ozone pollution problem. The emphasis in the bill, however, is not on the deadlines but on what happens in the period before deadlines. The concept of reasonable further progress, which is in the current Act, is amplified by requiring specific incremental progress over defined periods for each of the pollutants addressed: ozone, carbon monoxide, and particulate matter (PM-10). Remedial steps are mandated if an area fails to meet these periodic milestones. The bill also requires periodic updates of inventories and establishes regular reporting requirements for the States and explicit data that must be prepared by the States and reviewed by EPA.

The bill imposes emissions fees on stationary sources and registration fees for vehicles in order to provide State and local agencies the resources, from polluters, to conduct effective air pollution control programs, including complying with the more explicit requirements of the bill. Stationary source fees will also provide EPA with additional resources.

Motor vehicles are the single largest source of ozone and carbon monoxide pollution. Title II of the bill addresses emissions that result from the operation of vehicles, but that, alone, is not enough. Pollution can also be reduced if fewer vehicle trips take place in polluted and congested urban and suburban areas. Title I contains several provisions to encourage State and local governments, employers and drivers to plan ahead to reduce vehicle use while maintaining—and in some cases where congestion is a serious problem actually enhancing—mobility.

The bill reflects an increasing understanding of how ozone pollution is formed and transported. Because ozone is not a local phenomenon but is formed and transported over hundreds of miles and several days, localized control strategies will not be effective in reducing ozone levels. The bill, thus, expands the size of areas that are defined as ozone nonattainment areas to assure that controls are implemented in an area wide enough to address the problem. For the northeastern United States, the bill establishes an ozone transport region and requires that sources of ozone-forming pollutants throughout the region—whether the sources are in attainment or nonattainment areas—install certain controls.

The bill also requires control of oxides of nitrogen (NO_X) as a means of reducing ozone levels. While there remain uncertainties about the localized effect of NO_X reductions on ozone levels, it is generally accepted that overall levels of ozone are more effectively reduced by reducing both NO_X and volatile organic compound (VOC) emissions than by reducing VOCs, alone. Oxides of nitrogen also contribute to PM-10 levels and are a precursor of acid rain.

In summary, the nonattainment provisions of the bill are designed to bring about emissions reductions from *all* the major sources that contribute to ozone CO, and PM-10 pollution, to require regular and monitored progress toward attainment, and to assure that where progress is not what was predicted or needed to attain the standards, additional steps are taken to keep an area on the path to attainment by the required deadline.

DESIGNATION OF AREAS (SECTION 101)

SUMMARY

The bill amends section 107 of the Clean Air Act as follows:

A revised section 107(f)(1) of the Act requires that within six months of issuing a new or revised ambient air quality standard, the Administrator must designate all areas of the country as either attainment, nonattainment or unclassifiable. An area that either does not meet the standard or contributes pollution to another area that does not meet the standard is to be designated nonattainment. An area that meets the standard and does not contribute to another area that exceeds the standard is to be designated attainment. An area that cannot be classified on the basis of available information as meeting the standard is to be designated unclassifiable.

Revised section 107(f)(3) of the Act designated any area that did not meet the primary ambient air quality standard for ozone or carbon monoxide as of the last calendar year before the date of enactment of the bill as nonattainment. Revised section 107(f)(4) designates each area that was identified by EPA as a Group I area in the August 7, 1987, promulgation of the revised particulate standard (PM-10) or which contains a site for which monitoring data shows a violation of the air quality standard for PM-10 before the date of enactment as nonattainment.

Revised section 107(d)(5) of the Act provides that areas may be redesignated by the Administrator upon the request of the Governor of a State or on the Administrator's own motion. The Administrator must act to redesignate an area not currently designated as nonattainment as a nonattainment area within one hundred eighty days of receiving evidence that the area exceeds the national ambient air quality standard for any pollutant. In order to redesignate an area from nonattainment to attainment, the Administrator must promulgate the redesignation by rule, must determine that the area has attained the air quality standard and that attainment is due to permanent reductions in emissions, must have approved a maintenance plan, and determine that the State containing the area has met requirements of the Act applicable to the area. The Administrator may not redesignate an area from nonattainment to unclassified.

New paragraphs (2) and (3) of section 107(d) of the Act provide that the boundaries of an area that is designated nonattainment for ozone and that is located within a metropolitan statistical area (MSA) or a consolidated metropolitan statistical area (CMSA) are the boundaries of the MSA or CMSA, unless the State demonstrates that some portion of the MSA or CMSA does not contribute to violations of the air quality standard and that there is a geographical basis for excluding the portion. With respect to a serious carbon monoxide area, the Administrator may, by rule, include the entire MSA or CMSA in the nonattainment area.

DISCUSSION

This section of the bill restructures and clarifies the process for designating and redesignating areas of the country depending on their emissions and ambient air quality. The bill gives significant authority to the Administrator in order to overcome the deficiencies in current law that have failed to allow the Administrator to respond to new information about pollution levels and control needs.

Existing law, as interpreted by EPA, precludes the Administrator from issuing new designations or revising existing ones when an ambient standard is revised, as occurred with the promulgation in 1987 of the ambient standard for PM-10. Current law is also read to prohibit new or revised designations unless requests have been received by EPA from a State, see, e.g., *Bethlehem Steel* v. *EPA*, 723 F. 2d 1303 (7th Cir. 1983). Questions have also arisen about EPA's authority to define broad nonattainment boundaries, *Illinois State Chamber of Commerce* v. *EPA*, 775 F. 2d 1141 (7th Cir. 1985).

The bill requires the Administrator to designate the status of all areas within six months of the date a new ambient standard is promulgated or an existing standard is revised. An additional six months is available if sufficient information is not available to make the designations by the first deadline. EPA may rely for these designations on sound data that is available, preferably air quality monitoring data, but in some cases where appropriate and necessary, the Agency may rely on modeling or on statistical extrapolation from monitored concentrations of another pollutant.

The Administrator is given broad discretion to determine the boundaries of the designated areas based on air quality, planning and control considerations, and other appropriate considerations. The bill explicitly provides that EPA may include within the boundary an area that may cause or contribute to nonattainment in another area, regardless of whether pollutant concentrations in the first area exceed the standard.

The bill by operation of law designates areas as ozone or carbon monoxide (CO) nonattainment areas if they did not meet the primary standard for these pollutants (or other) as of the last calendar year before the date of enactment. The Environmental Protection Agency's current methods for determining attainment status with respect to these pollutants are to be the basis for determining whether an area met the standard as of the applicable date. For example, for ozone areas this would involve the most recent three years of data. And for CO, this means use of the most recent two years of data.

The bill specifies by operation of law, that minimum boundaries for any zone nonattainment area that is located in a metropolitan statistical area (MSA) or consolidated metropolitan statistical area (CMSA) are the boundaries of the MSA or CMSA. If, for clear geographic reasons such as a mountain range that runs through a CMSA or MSA, emissions from an attaining portion of the area do not cause or contribute to air pollution in a nonattaining portion, the Administrator may approve a State's request to exclude the attaining portion from the nonattainment area.

The bill authorizes the Administrator to redesignate an area at any time, on the Administrator's own motion or on petition from a State, based on air quality, planning and control, and other appropriate considerations. This provision makes clear that the Administrator does not have to wait for a request from a State before making a redesignation. As under current law, the submission of a redesignation petition by a State has no effect on the SIP requirements for the area for which the redesignation is requested, notwithstanding allegations which have been presented in counterclaims to Agency enforcement actions that the pendency of a State request for a redesignation to attainment is sufficient to render the current SIP unenforceable unless and until EPA denies the request.

The Administrator may redesignate an area from nonattainment to attainment only by rule after determining that the area has met all the requirements applicable to it under part D and section 110 of the Act, including implementation of all stationary and mobile source controls specified in the Act. As a condition for redesignation, the Administrator must determine that improvement in air quality is due to permanent reductions in emissions, which means that control requirements that are in place at the time the redesignation is sought must remain in effect after redesignation. The bill also requires the Administrator to determine that the maintenance plan required as a condition of redesignation assures that emissions levels will not rise so as to cuse exceedances of the applicable standard.

ENHANCED MONITORING AND INVENTORIES (SECTION 102)

SUMMARY

Within six months of enactment of the Clean Air Act Amendments of 1989, the Administrator must publish guidance on improved air quality monitoring an preparation of emissions inventories for use by the States.

DISCUSSION

Monitoring.—Ozone and carbon monoxide (CO) monitoring networks have been relatively stable since the last major round of State implementation plan revisions in 1982. Nationally, ozone monitoring has grown from 610 monitors nationwide in 1982 to 630 at present, while CO monitors increased from 440 to 460. The current network leaves unanswered several important questions about these pollutants and the most effective ways to reduce ambient levels. In addition, the PM-10 network, being a relatively new program, will need careful scrutiny as it matures. The guidance required to be issued by the Administrator should address some specific issues with respect to each of these pollutants.

For ozone, there is a need for enhanced ozone monitoring in rural areas since rural areas are not adequately covered or characterized by existing ozone monitoring networks. The downwind area affected by ozone transport often extends far past the coverage of current monitoring systems. Since neither the concentrations nor the extent of the ozone problem in non-urban areas are fully understood, the rural population may be exposed to high ozone levels caused by this pervasive urban problem. Additionally, detrimental effects on agriculture and forestry have been documented in recent research and point to the need for expanding the area coverage of the ozone networks.

Also, the complex mechanisms for ozone formation and the sources of ozone precursors and their interactions remain somewhat unclear. These uncertainties suggest that if realistic, economic, and effective control strategies are to be developed, the establishment of comprehensive ozone precursor (volatile organic compounds (VOCs) and nitrogen oxides) monitoring in nonattainment areas is needed. This precursor monitoring should include systems for both biogenic and anthropogenic VOCs. Nonmethane organic compound (NMOC) monitoring should be instituted to track and corroborate VOC emission reductions that are assumed or projected in SIPs, to identify VOC species that may be having a significant effect on the ozone problem, and to verify and corroborate emission inventories.

For carbon monoxide, an effort to review the adequacy of existing CO networks for charaterizing the spatial distribution of the CO problem and whether an area is attainment or nonattainment must be initiated. To properly site and evaluate networks, define critical areas of impact, and to corroborate attainment/nonattainment decision, the use of inexpensive, portable, saturation monitoring techniques is needed. With constantly increasing vehicle miles traveled in the United States, there is a need for increased deployment of CO monitors and increased oversight of CO monitoring networks to ensure their adequacy.

In addition to the evaluation of the adequacy of the PM-10 network and its sites, such monitoring should be enhanced for areas experiencing ambient concentrations from nontraditional sources such as residential wood combustion, agricultural tilling and diesel particulates.

Inventories.—Emissions inventories for ozone and CO are generally acknowledged to have major deficiencies which have contributed significantly to undercontrol of emissions and the lack of progress in many urban areas in attaining the ambient standards for these pollutants.

The overriding major deficiency is the generally inadequate resources and staffing devoted to emission inventory development programs at the State and local levels, as well as by EPA of the Federal level. More specifically, major deficiencies include the following:

—Inadequate quality assurance programs and national oversight by EPA to assure acceptable quality and consistency of these inventories, including lack of comprehensive and prescriptive guidance on how to develop these inventories and absence of consistent review procedures that would assure that requirements are being adhered to.

—Lack of completeness in inventories. Area source inventories for small, but ubiquitious sources, for example, consumer solvents, were not compiled in many areas. Also, newly identified significant sources were not included.

—Lack of periodic inventory updating that would allow credible tracking of reasonable further progress.

To assure that future ozone and CO SIPs are based on inventories that are complete, current and accurate, the bill provides for substantial increases in funding (sections 106, 107, 108 and 109) to carry out improvements through emission fees that will provide resources at all levels of government.

The greatest deficiency in current efforts to develop good PM-10 inventories is the incomplete set of emission factors needed to estimate emissions from point sources and, more importantly, from area sources—mostly fugitive dust sources—that are dominant in arid areas of the western United States. To develop these emission factors, field testing needs to be conducted. Some field testing and engineering efforts also need to be devoted to developing reliable control efficiency information relative to control of PM-10 for many of the control devices and practices that have been used to control total particulate matter. Presently, rough default approximations of PM-10 control efficiencies are being used in estimating PM-10 emissions from controlled sources.

Area source emissions estimating procedures for PM-10 also provide only rough approximations of PM-10 emissions and need improvement that will take several years to achieve. Area source procedures apply, for example, to paved and unpaved road dust reentrainment, storage piles, construction activities, residential wood burning, road salting and sanding.

The bill, in this section and section 109 (pertaining to PM-10), requires the Administrator to publish guidance to address the deficiencies enumerated.

TRANSPORTATION GUIDANCE (SECTION 103)

SUMMARY

The bill amends section 108(e) of the Act and requires the Administrator, in consultation with the Secretary of Transportation and State and local officials, to revise the Transportation-Air Quality Planning Guidelines issued in 1987. The Administrator is also required, by an amendment to section 108(f) of the Act, to publish updated information on a specified list of transportation control measures, including information on the emissions reductions potentials of each measure.

DISCUSSION

The purpose of the amendment to section 108(e) is to provide updated guidance to State and local officials on how best to coordinate air quality and transportation planning in an area.

The purpose of the amendment to section 108(f) is to require the Administrator to take a strong role in providing assistance to State and local agencies regarding transportation control measures. States containing areas classified as severe or extreme for ozone and serious for carbon monoxide will be required to consider these measures as part of their State implementation plan. The intent of revisions of section 108(f) is to give States the information they will need to implement measures that have the potential of decreasing emissions by reducing vehicle miles traveled (VMT) or improving traffic flow.

Transportation control measures are needed because the VMT nationwide is projected to increase by 2 to 3 percent per year from now through 2005, resulting in a cumulative increase of about 40 to 60 percent, according to the Congressional Office of Technology Assessment. Average nationwide motor vehicle exhaust emissions are projected to decline through the late 1990s as an increasing percentage of vehicles on the road meet new standards, but to rise after that due to the increase in VMT.

Because of these projected emission trends, in many nonattainment areas it will be necessary to implement transportation control measures which can bring about reductions in future VMT growth, but at the same time provide enhanced mobility to serve increasing travel demands. The intention of the requirements in the bill related to transportation planning and control measures is to direct air quality and transportation planning toward optimum use of all potential alternatives to the single occupancy vehicle, ranging from highway facilities dedicated to moving high occupancy vehicles, to providing carpool, vanpool services and improved public transit.

The 1977 Amendments to the Act required areas that would not be able to meet the ozone or carbon monoxide standards by 1982 to implement transportation control measures (TCNs) as necessary to attain the standards, and some areas included these measures in their State implementation plans. However, OTA reports that the effect of these measures has not been evaluated at the Federal level because EPA's Office of Transportation and Land Use Policy was eliminated in 1982 and EPA has not required any reporting from the states.

In contrast, the South Coast Air Quality Management District and the Southern California Association of Governments completed in 1987–8 an assessment of the effectiveness of TCMs for the Los Angeles area. The study concluded that implementation of a wide range of TCMs would reduce highway vehicle VOC emissions by a total of 30 percent by 2010, compared to levels projected without TCMs. Total reductions in highway vehicle emissions of NO_x, carbon monoxide and particulate matter based on the TCM measures are also expected to be about 30 percent, compared to emissions levels projected for 2010 without the measures.

These studies indicate that in order to reduce or even avoid increases in vehicle pollution, it is not enought to control the pollution each car emits; the use of the car must be examined as well because growth in VMT threatens to overwhelm what can be achieved through tailpipe standards. These provisions, coupled with others in the bill, give EPA and the States the power to pursue a wide range of transportation demand management efforts.

GENERAL PLANNING REQUIREMENTS (SECTION 104)

SUMMARY

This section of the bill makes numerous revisions to section 110 of the Clean Air Act, many of which are technical, to eliminate outdated material. Substantive changes include the following:

States must submit State Department implementation plans (SIPS) within no more than 24 months after the promulgation of a national ambient air quality standard, rather than within nine months as in existing law.

Areas designated attainment or unclassifiable for a pollutant may be required by the Administrator to submit a SIP that shows how the area will maintain compliance with the ambient air quality standard for a 20-year period. States required to submit maintenance plans must update them every ten years. Any attainment or unclassified area that contains all or part of on MSA or CMSA must submit maintenance plans to the Administrator.

Provisions in existing law requiring SIPs to take into account the effect of emissions on other States are strengthened.

The bill requires the Administrator to issue minimum criteria that any SIP submission must meet and sets up timetables and procedures for EPA to determine whether or not to approve a SIP.

If a State fails to submit an appropriate SIP within two years after being sanctioned for failure to submit such a plan, as required by subpart D of the Act, the Administrator must promulgate a Federal implementation plan. The initial Federal plan must require reductions in emissions but does not have to provide for attainment. Within three years after proposal of the initial plan, the Federal plan must be revised to so provide.

The bill makes clear that provisions of an approved SIP stay in effect and are enforceable until a revision is approved by the Administrator.

DISCUSSION

Submission and review of plans.—Experience since passage of the Clean Air Amendments of 1970 has shown that nine months is not adequate time for States to prepare and submit implementation plans for new or revised ambient air quality standards. The bill extends the period to twenty-four months. This period applies to submission of maintenance plans, which are required for every MSA or CMSA that is contained in or contains an area designated attainment or unclassified with respect to a criteria pollutant, and to plans for every area designated nonattainment for any such pollutant, as well as to any other area the Administrator determines must submit a SIP.

Revisions to section 110(a)(2).—The bill replaces provisions currently in section 110(a)(2) of the Act with provisions that appear in paragraphs (1)–(12) of rewritten section 110(c) of the Act. The changes are as follows:

Paragraph (1) of rewritten section 110(c) combines and streamlines existing section 110(a)(2)(B) and the enforceability requirement of section 172(c) of current law.

Paragraph (2) rewrites existing section 110(a)(2)(C).

Paragraph (3) rewrites and streamlines current section 110(a)(2)(D), deleting the reference in that section to the preconstruction review program in section 110(a)(4) of existing law.

Paragraph (4) is described below in the interstate pollution discussion.

Paragraph (5) rewrites and expands current sections 110(a)(2)(F)(i) and (vi). The new provision requires that where a local authority, to which a State has granted authority to implement a SIP, fails to do so, the State will have the means and authority to implement the plan. EPA can hold the State responsible for any implementation failure caused by local action or inaction, or choose to exercise its existing authority to implement the SIP itself or act directly against the local authority. In addition, the State is required to manage and keep up-to-date information on implementation by local authorities so that EPA only has to rely on the State agency when it wishes to track implementation of measures throughout the State.

Paragraph (6) incorporates and expands current section 110(a)(2)(F)(ii)–(iv).

Paragraph (7) rewrites current section 110(a)(2)(F)(v).

Paragraph (8) rewrites current section 110(a)(2)(H).

Paragraph (9) replaces current section 110(a)(2)(I) with a simple cross-reference to part D, deleting the construction ban in the existing section. Revised construction ban provisions appear elsewhere in the bill in revisions to part D.

Paragraph (10) rewrites current section 110(a)(2)(J).

Paragraph (11) adds a new provision to the Act requiring air quality modeling as prescribed by the Adminstrator to ensure that States perform the technical work necessary to provide the basis for pollution control strategies.

Paragraph (12) rewrites current section 110(a)(2)(K) with minor revisions to be consistent with new permit fee requirements in titles I and V.

SIP provisions addressing interstate pollution.—Section 110(a)(2)(E) of the Act is replaced by new section 110(c)(4), which, together with changes made to section 126 of the Act by section 110 of the bill, improve the effectiveness of the Act as a means of dealing with interstate air pollution. Where prohibitions in existing section 110(a)(2)(E) apply only to emissions from a single source, the amendment includes "any other type of emissions activity," which makes the provision effective in prohibiting emissions from, for example, multiple sources, mobile sources, and area sources.

For interstate pollution to violate current law, it must "prevent attainment." Since it may be impossible to say that any single source or group of sources is the one which actually prevents attainment, the bill changes "prevent attainment or maintenance" to "contribute significantly to nonattainment or interfere with maintenance by," thus clarifying when a violation occurs.

Under existing section 110(a)(2)(E), interstate pollution that is to be prohibited under a SIP is that which leads to a violation of the Act's specifically protected interests—attainment of the ambient standards, prevention of significant deterioration, or visibility. There are many legitimate State interests that are not spelled out and explicitly protected by the Act, for example, the effect of toxic pollutants on health or the environment. The amendment in new section 110(c)(4) makes an injury to interests that may be identified by States but that are not explicitly listed in the statute—described as "an adverse effect on public health or welfare or the environment"—a violation of the Act.

EPA action on plan submissions.—The Environmental Protection Agency reports that in recent years a substantial number of SIP submissions have been incomplete or so deficient that they have not warranted further review. Newly rewritten section 110(d)(1) of the Act requires EPA to issue minimum completeness criteria that any SIP submission must meet and provides that the Agency need not review submissions that fail to meet the criteria. Where the Administrator finds that a SIP submission does not meet the minimum criteria, the State shall be treated as having failed to make the required submission for purposes of the sanctions provisions of the Act.

New section 110(d)(2) requires EPA to act on each SIP submission within twelve months of the date EPA determines (or is deemed to have determined) that the submission is complete. The four-month period provided in current section 110(a)(2) has proved insufficient to allow EPA to conduct the necessary analyses and rulemaking proceedings.

New section 110(d)(3) authorizes EPA to approve a plan in full, disapprove it in full, or approve it in part and disapprove it in part, depending on the extent to which it meets the requirements of the Act. This provision overrules the portion of the decision *Abramowitz* v. *EPA*, 832 F. 2d 1071 (9th Cir. 1987), which held that EPA could not approve individual measures in a plan submission without either approving or disapproving the plan as a whole.

New section 110(d)(4) provides that a finding by the administrator of the inadequacy of a SIP could renew previously applicable requirements, even if those requirements contained fixed, elapsed deadlines. The Administrator is given the authority to adjust the statutory deadlines consistent with the time originally allowed in the law for compliance with the requirements.

Federal implementation plans.—The bill in a rewritten section 110(f) of the Act, changes existing law (section 110(c) of the Act) with respect to the preparation of Federal implementation plans (FIPs). Current law requires the Administrator to prepare a FIP whenever a State fails to submit an approvable implementation plan, the plan is determined not to be in accordance with requirements of the act, or the State fails to revise its plan as required by the Act. In several instances EPA has been compelled by court orders to prepare FIPs.

The success of air pollution control under the Clean Air Act is premised on strong State and local control programs. Preparation by EPA of control plans applicable to specific areas within a State should be a last resort, but it is an important one to have available in cases where a State fails to take the required steps to achieve a health-based ambient standard.

The bill authorizes, but does not require, the Administrator to promulgate a FIP whenever a State fails to submit a plan or submits a plan that is not adequate. The Administrator is required to propose a FIP only after a State has been sanctioned for failure to submit a plan or portion of a plan that meets the requirements of the Act and has not submitted an approvable plan or portion within two years after the sanctions were imposed. The Administrator must promulgate a FIP within one year after the end of the two-year sanction period, unless the State has submitted a plan that meets the requirements of the Act. If the State's plan or portion of a plan was required to demonstrate attainment of an ambient standard, the FIP must demonstrate attainment, but not in the original promulgation. The original promulgation must require effective emissions reductions, but an additional two years are provided the Administrator to revise the original FIP to provide such a demonstration.

Applicable implementation plan provisions.—The bill adds a new subsection 110(k) to the Act to clarify that a provision of a SIP that has been approved by the Administrator remains in effect and is enforceable until a subsequent revision is approved by the Administrator. Current law on this issue is not clear, as courts have differed in their interpretation of the Act's requirements.

FEDERAL FACILITIES (SECTION 105)

SUMMARY

The bill amends section 118 of the Clean Air Act to make clear that Federal facilities are subject to fees and charges levied by State or local agencies to the same extent as nongovernmental entities.

DISCUSSION

Military installations in California's South Air Quality Management District have filed suit challenging the District's authority to require payment of fees, including permit fees. Similar suits have been filed in Federal District Court in New York, and there have been other challenges to the authority of State or local agencies to impose fees on Federal facilities. The bill clarifies existing law to make explicit what section 118 already requires: Federal facilities are subject to the same fee requirements that are applicable to nongovernmental entities.

GENERAL PROVISIONS FOR NONATTAINMENT AREAS (SECTION 106)

SUMMARY

This section of the bill designates sections 171-178 of the Act as subpart 1 of part D, adds new sections 170 and 179, and makes changes in sections 171-176 as follows:

A new definition is added to section 171. "Major stationary source" or "major emitting facility" is, for the purposes of part D of the Act, defined as including "each discrete operation, unit, or other activity and each combination thereof". The definition of "nonattainment area" is also clarified.

The plan for an area that has been designated nonattainment with respect to an ambient air quality standard must provide for attaining that standard five years from the date the nonattainment designation was made. The Administrator may extend the deadline for up to an additional five years.

All major stationary sources in nonattainment areas are required to have operating permits, beginning three years after the date of enactment of the Clean Air Act Amendments of 1989. Operating permits must be issued for no more than five years, and applications for a permit must be accompanied by a fee sufficient to cover the source's share of the direct and indirect costs of developing and administering the permit program. A permit application must be submitted to the Administrator who has sixty days to object to its issuance.

Sources of volatile organic compounds, oxides of nitrogen, PM-10, and carbon monoxide are required to pay an emissions fee of no less than $15 per ton, which will be available to be appropriated to EPA to carry out its responsibilities under the Act.

States with ozone or carbon monoxide nonattainment areas and local elected officials of those areas are required to review and update, as necessary, planning and implementation procedures that specify the State, local, or regional agency or agencies that will develop, adopt and implement each element of the SIP.

Sanctions are made available to the Administrator to be used as prescribed in the new subparts of the Act relating to ozone, carbon monoxide, and PM-10. The available sanctions include construction bans on major sources; limitation of the use of Federal highway funds to specified projects that will improve air quality, and withholding all or part of State air pollution grants.

The requirement under existing law in section 176(c) that Federal activities must conform to a State implementation plan is clarified and elaborated and redesignated as section 176(b).

A new section 170 of the Act provides that if any of the provisions of subpart 1 is inconsistent with, or applies to the same situations as a more specific requirement found in the other subparts of part D, the more specific requirement is to be applied.

A new section 179 is added to the Act to specify the elements of maintenance plans that must be approved by the Administrator before an area can be redesignated from nonattainment to attainment.

DISCUSSION

Definition of "major stationary source".—Current law defines major stationary sources as those that emit one hundred tons or more per year of a pollutant. In nonattainment areas the category of "major stationary source" is an important one because if an owner or operator proposes to construct or modify such a source, certain conditions to minimize emissions must be met.

The Environmental Protection Agency in 1981 changed the definition of "major stationary source" for regulatory purposes in nonattainment areas, and subsequent litigation upheld the Agency's change (*Chevron U.S.A.* v. *Natural Resources Defense Council, Inc.*, 467 U.S. 837 (1984)). The effect of the change has been to permit more sources in nonattainment areas to escape the stringent new source review provisions of the Act and, thereby, avoid minimizing emissions. Under regulations currently in effect, a proposed source can avoid the new source review requirements if emissions reductions elsewhere in the facility offset emissions from the proposed source so that the net increase in emissions is less than one hundred tons per year.

The bill defines a major stationary source as "each discrete operation, unit or other activity and each combination thereof" in order to assure that any time a proposed new or modified emitting unit or operation will increase emissions of a nonattainment pollutant in a nonattainment area by the prescribed tonnage, it must meet the new source conditions of the Act, whether or not simultaneous emissions reductions are achieved elsewhere at the facility at which the emissions increase takes place. The bill, in the new ozone, CO and PM-10 subparts to the Act, provides for variable tonnage definitions for major stationary sources, ranging from one hundred tons to ten tons, depending on the area and the pollutant.

The language "or combination thereof" assures that where a combination of individual emitting operations will, in the aggregate, emit the threshold tonnage for a major stationary source, the requirements of part D applicable to a major stationary source cannot be avoided by treating each operation as a source that is under the tonnage threshold. The aggregate emissions of these discrete operations must also be considered, and if the aggregate meets the prescribed tonnage, part D major stationary source requirements apply.

Attainment dates for nonattainment areas.—The bill requires that any area that is designated nonattainment must attain the applicable primary ambient air quality standard "as expeditiously as practicable" but no later than five years from the date of designation. This requirement means that any implementation plan applicable to a nonattainment area must provide for attainment as expeditiously as practicable. The Administrator is given authority to extend the five-year deadline to the earliest date feasible, but in no case more than ten years after designation as nonattainment. Except in unusual circumstances of severe levels of pollution and pollution sources that are exceptionally difficult to control, areas designated nonattainment should be required to achieve the health standard in, at most, five years from the date they are designated nonattainment. If the Administrator determines that attainment in five years is not feasible because of the unusual circumstances, the extension should be for the minimal time needed, not automatically for an additional five years. The key phrase is "as expeditiously as practicable," and this phrase applies to the determination by the Administrator in all cases.

Fees.—Major stationary sources that are liable for the payment of fees to a State or local air pollution agency must also pay to EPA an annual fee of no less than $15 per ton of VOC, NOx, CO and PM-10 emitted. EPA estimates that this fee, if imposed at $15 per ton, not including the PM-10 component, would raise about $80 million annually.

The bill nearly doubles the workload that EPA must perform in carrying out the requirements of the Clean Air Act. Thus, while EPA's budget, including State grants, is approximately $250 million to implement the Act in fiscal year 1990, it is reasonable to expect that almost $450 million will be needed in 1991 if this bill is enacted. Simply to carry out the needed monitoring and inventory work on which so many regulatory decisions are based will require substantially larger sums than are currently budgeted.

The fees, which are to be deposited in a special fund in the Treasury, would be available for appropriation only to EPA to carry out its responsibilities under the Act. Given the increase in EPA's workload, it is clear that the fees are necessary additions to funds currently appropriated to the Agency to carry out the Act. Funds appropriated to EPA from the special Treasury fund should be *in addition to* the funding level currently being appropriated.

Planning procedures.—The purpose of the language amending section 174(a) of the Act is to clarify that the Governor has the ultimate responsibility on behalf of the State, along with local elected officials, to update and review the planning procedures already in effect or to develop new planning procedures to implement the revised plan. The Governor is responsible for deciding which organization will prepare the revised implementation plan, in consultation with appropriate local government officials and organizations and air quality and transportation agencies of the State. The provision should improve the coordination of the SIP process by ensuring that one entity, the State, has the lead role in planning for implementation of the revised plan.

This provision should not require changes in existing procedures or the existing allocation of responsibilities, simply for the sake of change. Where the relevant State, local and regional agencies have recently—within the last two years—reviewed these issues and reached agreement, the provision does not require additional review or altered determinations so long as the State, in consultation with the other affected agencies, concludes the existing arrangement is satisfactory to carry out the requirements of the Act as amended by the Clean Air Act Amendments of 1990.

The purpose of the language amending 174(b) is to require that the Department of Transportation's planning process take into account air quality planning. The effects on air quality of transportation decisions are to be recognized in the transportation processes and the Administrator is required to play an active role in these processes. Because transportation sources currently account for about 50 percent of urban ozone, 90 percent of urban carbon monoxide levels, and average nationwide motor vehicle exhaust emissions are projected to increase by the year 2000, it is critical that transportation strategies that serve mobility and at the same time improve air quality is critical.

Sanctions.—It is abundantly clear that the nonattainment problem in the most severely polluted cities is directly related to total auto use and that projections for future increases in auto use (measured in vehicle miles traveled—VMT) are the cause of much of the emission growth in those cities and a major reason why such areas are not likely to attain the ozone or carbon monoxide ambient air quality standards in less than ten—and sometimes more—years.

When section 176(a) was added to the Clean Air Act by the 1977 Amendments, its restrictions on Federal transportation funding were seen by many as a sanction to be threatened when local or State officials failed to submit an acceptable SIP. Given the role that VMT and related vehicle and urban area population growth play in interfering with attainment and maintenance of ambient air quality standards, it is imperative that Federal investment in transportation be viewed, not as a sanction, but as one of the most powerful tools to address the contribution of automobiles to the urban nonattainement problem.

The bill, therefore, affirmatively requires that Federal transportation investments in nonattainment areas that fail to submit or implement SIPs or achieve interim reduction standards, be shifted to transportation programs that are designed to provide alternatives to the single occupancy vehicle and that contribute to reducing future VMT. Federal money should be spent in nonattainement areas, for example, to expand high-occupancy, shared-ride services and facilities that help reduce VMT growth. The bill would ensure that normal appropriated and obligated levels of funding continue to be available to States and localities, but those funds would be redirected in the affected nonattainment areas to programs (enumerated in section 176(a)(2)(B) of the Act, as amended) that would help reduce vehicle emissions. To further encourage these programs, the Federal to State funding match is set at a ratio of 90 percent Federal to 10 percent State funds.

The bill specifies that directing Federal transportation investments to systems designed to reduce VMT growth would not forclose the use of Federal resources for the rehabilitation and replacement of deteriorating existing bridge facilities that present a safety hazazd, or for the elimination of highway safety hazards under the programs set out in title 23 of the United States Code, sections 130, 152, and 402.

Where increased vehicle use is the sole or primary cause of a safety hazard, a project to expand the capacity of a facility does not qualify under the exception contained in subparagraph (2)(C). The objective of the bill is to promote the adoption and implementation of policies to reduce vehicle use in nonattainment areas. Thus, safety hazards caused solely or primarily by congestion or the use of a structure or facility beyond its design capacity should be removed by reducing, controlling or limiting vehicle access to the structure or facility rather than by expanding capacity.

The bridge rehabilitation or replacement exception in subparagraph (2)(C)(ii) is also limited by the same policy objective. The prohibition against adding any significant "right-of-way" is intended to prevent the construction of a stucture that adds lane capacity beyond that included in the structure to be rehabilitated or replaced. This prohibition also addresses the full project of which the rehabilitation or replacement is a part. Federal money would not be available for rehabilitation or replacement of an existing span where the rehabilitation or replacement is part of an overall expansion of capacity in a traffic corridor. Thus, for example, Federal money would not be available to replace an existing span as part of a project that would add State or private funding to build two spans or add a second deck or expand an access road.

The programmatic approach to Federal investment in transportation adopted in the bill in this and other sections would not only provide an incentive to attain standards sooner, but would also redirect Federal resources toward promoting the planning and operation of transportation systems that become part of the clean air and congestion solution rather than part of the problem. It would also help stimulate local transportation planning at for innovative alternatives to the single occupant auto.

To promote the air quality objectives of this section when sanctions are in effect, the Secretary and the Administrator should evaluate alternative projects under subparagraph (2)(B) with regard to their air quality benefits in the nonattainment area. If transportation projects have been appropriately prioritized with regard to their air quality benefits in the applicable implementation plan, the Secretary should in most cases redirect funding from precluded projects in accordance with such plan. If such a priority has not been established in the plan, or if the Secretary or Administrator believes that other projects are likely to be more effective in achieving the air quality objectives of this section, consultation should occur between the Secretary, Administrator and the lead planning agency designated under section 174 to indentify the projects that should receive priority funding.

Such a process will be especially necessary in nonattainment areas without an approved initial plan revision or with an inadequate plan, since in those areas there will be no implementation plan that can properly be used to determine the conformity of regional transportation plans or the projects included in the transportation improvement program submitted by the metropolitan planning organization. The Administrator may include such procedures and criteria for project selection under subparagraph (2)(B) in the guidelines issued pursuant to section 108(e). In addition, the Administrator may require that transportation projects be prioritized with regard to their air quality benefits in the implementation plan, as a means of assuring attainment and maintenance.

Conformity requirements.—The bill redesignates section 176(c) of the Act as section 176(b) and clarifies what is meant by requiring that activities assisted, supported or licensed by Federal agencies "conform to" a State implementation plan. The purpose of the conformity language is to assure that before in any way participating in an activity, a Federal agency must find that the activity does not cause or contribute to violations of an ambient standard in any area, does not increase the severity or frequency of existing violations, and does not delay progress in achieving ambient standards in any nonattainment area. The intent of the conformity provision is to encourage medium- and long-term planning for achieving and maintaining air quality standards. By evaluating air quality impacts of proposed activities before they are undertaken, future pollution problems can be prevented.

The bill contains explicit language concerning the responsibilities of Federal, State and local transportation planning and implementation agencies. First, transportation plans or programs developed pursuant to the Federal highway program or the Urban Mass Transportation Act must implement the transportation-related provisions of the State implementation plan. No transportation program of projects can be approved or adopted by a metropolitan planning organization or other recipient of Federal highway or Urban Mass Transportation Act funds until it determines that the program provides for implementation of air quality-related transportation projects included in the State implementation plan on the schedule provided in the SIP.

Since the SIP is required to identify adequate funding sources for implementation of strategies specified in the SIP, there should be resources available from the combined State, local and Federal sources to complete each of the projects in the SIP on a timely basis. However, if available resources from all sources are not sufficient to adequately fund the projects indentified in the SIP during any funding cycle, then appropriated Federal resources may only be used to fund air quality-related projects identified in the SIP.

If the State and local funds necessary to adequately fund the transportation projects identified in the SIP are not made available, the Administrator should take the actions required by section 184(b). If State and local funds are made available for transportation projects but are not dedicated to timely completion of the projects contained in the SIP, the relevant governmental entity should be subject to appropriate enforcement actions, including the administrative sanctions available under the Act. The restructuring of the Federal funding sanctions by these amendments should not be construed as disturbing existing case law or as depriving the district courts of appropriate remedies to require the performance of obligations voluntarily undertaken by governmental entities as part of an applicable implementation plan.

Second, no transportation plan or improvement program can be adopted by a metropolitan planning organization or found to be in conformity with the SIP by an air quality planning agency until an affirmative determination is made that (1) the emissions expected from the projects in the plan or program are consistent with estimates of motor vehicle emissions and emissions reductions included in the SIP and (2) the projects will not lead to new violations of ambient air quality standards or exacerbate existing violations.

With regard to regional transportation plans, conformity should be determined by considering the impact of the plan on vehicle use patterns in the entire nonattainment area for a long-term period. A lengthy time horizon is necessary to ensure that the plan will not stimulate or contribute to (VMT) greater than that contemplated by the percentage reduction requirements, the attainment demonstration, and the maintenance plan in effect under section 179. The conformity determination applies to each pollutant for which an attainment or maintenance plan is required. For the purposes of the conformity determination, the assumptions used in determining expected VMT associated with a transportation system or network must be consistent with the assumptions used in developing the SIP.

The section requires that the conformity determination consider "any growth likely to result from such activities." With regard to the review and approval of regional transportation plans developed pursuant to title 23, United States Code, this provision requires that the impact of adding highway capacity in or near the nonattainment area on patterns of vehicle use in such area be quantified to the extent feasible. It is recognized that the quantification of such relationships depends in part on the availability of alternate modes of transportation, the comparative cost of competing modes of travel, the relative frequency and convenience of alternate modes, and policies in effect that offer incentives for the use of alternatives to single occupant vehicles or that impose disincentives to such use. All of these factors can be considered in making the conformity determination. In taking account of these factors, credit should be given for elements of a regional transportation plan designed to reduce vehicle use that require the commitment of public funds, the implementation of regulatory requirements or the enactment of tax policies only where such funding commitments, regulatory requirements or tax policies are in place, are enforceable and are incorporated into the applicable implementation plan.

The transportation-related conformity requirements is to encourage medium- and long-range planning that takes into account air quality concerns and does not defer to a late date decisions about the air quality impacts of a particular project. However, if a particular project is either not part of a plan or program that has been found to conform to a SIP, or is significantly different in its emissions consequences from what was adopted in the plan or program, it must be evaluated by the metropolitan planning organization or other recipient of Federal highway or urban mass transportation funds and must be found to conform to the SIP before it can be allowed to proceed. In performing such evaluation, the project may be evaluated independently with regard to "hot-spot" pollutants such as carbon monoxide, but must be evaluated as an addition to the overall regional transportation plan with regard to areawide pollutants such as ozone, PM-10 or NO_x for which the area is required to have an attainment or maintenance plan. If the cumulative impact of the new project, along with the previously planned projects in the regional plan, results in air quality that does not meet the requirements of paragraph (1)(B), the project may not be funded or receive Federal approvals unless the regional plan is modified to achieve overall emission levels and air quality consistent with the requirements of paragraph (1)(B). An evaluation made for a new project should use updated air quality, VMT and emissions factors if the prior conformity determination for the regional plan relied on data that no longer accurately reflects current conditions.

The Administrator is required to promulgate criteria and procedures applicable to Federal, State and local agencies that must make the conformity determinations. The promulgation must require that procedures and criteria for the determinations be incorporated in SIPs for any ozone or carbon monoxide nonattainment area.

The criteria and procedures promulgated by the Administrator under this section shall supersede all criteria and procedures previously adopted by Federal agencies. The Administrator is required to promulgate these guidelines as regulations within one year of enactment so that they will provide legal criteria for the review of comparable provisions in implementation plans and establish legal requirements governing the actions of Federal agencies required to make conformity determinations under the Act.

Maintenance plans. The maintenance plan that must be submitted as a precondition for redesignation of an area from nonattainment to attainment must contain sufficient analyses and contingency measures to make it unlikely that the area will, in the future, exceed the health standard for the pollutant for which redesignation is ought, and to assure that if the standard is exceeded, immediate remedial measures will be instituted. The preparation of the maintenance plan requires long-term planning for the area with respect to emissions that may result from stationary and mobile source growth and reminds State and local officials and residents that it is easier to avoid unhealthy air through planning before significant decisions about an area's future are made, rather than try to change living, employment and transportation patterns after they are in place.

ADDITIONAL REQUIREMENTS FOR OZONE NONATTAINMENT AREAS (SECTION 107)

SUMMARY

This section adds a new subpart 2—and new sections 181 through 186—to part D of title I of the Clean Air Act. The new subpart classifies ozone nonattainment areas into categories, depending on the degree to which they exceed the ambient air quality standard for ozone, and prescribes deadlines for attaining the standard and requirement applicable to each category. "Moderate areas" are those that exceed the standard by no more than 20 percent and must attain the standard within five years of enactment. "Serious areas" exceed the standard by more than 20 percent but no more than 50 percent and are to attain no more than ten years after enactment. "Severe areas" exceed the standard by more than 50 percent but no more than 120 percent and have up to fifteen years to attain, while "extreme areas" exceed the standard by more than 120 percent and have up to twenty years to attain. Percentages refer to the percent by which an area's ozone design value as currently calculated by EPA, exceeds the level of the national primary standard for ozone.

Requirements for all ozone nonattainment areas. (New section 182 of the Act).—Every area must submit to EPA an inventory of emissions from each source of volatile organic compounds (VOCs) and oxides of nitrogen (NO_x) in the area. Each such source in a nonattainment area must submit annual to the statements to the State showing actual emissions of those pollutants. If the State provides an inventory for emissions from sources emitting less than 25 tons a year, it may waive the requirement that each of those sources submit annual statements.

Within eighteen months of enactment, the State must implement any element of a SIP that has been approved by the Administrator but has not already been implemented and must adopt and implement SIP revisions reflecting any control technique guideline issued before the date of enactment of the bill.

Each major stationary source of VOCs or NO_x is required to have an operating permit within three years of enactment. New or modified sources in serious areas must get offsets at a ratio of 1.5 to 1 (reduced emissions to new emissions) for VOCs, and in severe and extreme areas, at a ratio of 2 to 1. In an extreme area, offsets for NO_x must be obtained at a ratio of 2 to 1.

Motor vehicle registration annual fees of $2.00 per vehicle registered in a nonattainment area and stationary source annual fees of $75 per ton of VOC or NO_x are required, with the revenues to be used for developing and implementing the air pollution control program in the area.

Requirements for moderate areas. (New section 183 of the Act).—Each moderate area must implement either an enhanced inspection and maintenance program or a program to require service stations to install vapor recovery systems for refueling vehicles (Stage II systems). Nonattainment areas for which the design value for ozone is less than 0.13 part per million in the year immediately preceding enactment do not have to comply with either of the above requirements unless one or both is needed for the area to attain the standard by the deadline for moderate areas.

Requirements for serious areas. (New section 183 of the Act).—For VOCs, major stationary sources are defined for both serious and severe areas as sources emitting 25 tons or more. Inventories must include sources within a 25 mile radius of a metropolitan statistical area (MSA) or consolidated metropolitan statistical area (CMSA), if any, that is included within the nonattainment area.

For each area, the State must submit a SIP revision showing that VOCs will be reduced by 12 percent over each three-year period beginning after the date of enactment. All reductions, except those resulting from the decreased volatility of gasoline required under section 214 of the bill, may be counted toward the 12 percent. Within three years of enactment, the State must demonstrate that the area will attain the standard by the deadline required in the bill. Reductions in NO_x, other than reductions from Federal motor vehicle standards, may be substituted for reductions in VOCs if the State can show that the combination of VOC and NO_x reductions will result in reductions in ozone levels at least equal to ozone reductions that would result from the required VOC reductions alone.

The State must submit annual reports on its progress in implementing the SIP and in every third report, the State must demonstrate whether the assumptions in the SIP regarding motor vehicle emissions are proving correct. Where vehicle emissions exceed the SIP estimates, the State must develop and submit revisions to the SIP that incorporate transportation control measures to reduce vehicle-related emissions.

Serious areas must implement both enhanced I/M programs and Stage II vapor recovery requirements.

The State must require reasonably available control technology on all sources of VOCs that emit 25 tons or more and on all sources of NO_x that emit one hundred tons or more. RACT for VOCs must achieve at least an 80 percent reduction from uncontrolled levels unless, for a category of sources, such reductions are not technologically or economically feasible.

Finally, for a serious area a State must submit a revision requiring that in the event the standard is not achieved by the required deadline, a fee of $5,000 per ton of VOC is imposed on major stationary sources in the area, for each ton in excess of 50 percent of the amount of VOCs emitted in the calendar year the area was to have attained the ozone standard.

Requirements for severe areas. (New section 183 of the Act).—Severe areas must comply with all the requirements for moderate and serious areas and with the following additional requirements:

The area must adopt transportation control measures listed in section 103 of the bill or adopt other measures that will achieve comparable emissions reductions or show that reductions from one or more such measures is not necessary to attain the ozone standard as expeditiously as practicable but no later than the required deadline.

Employers of 100 or more employees in the area must implement programs to increase average vehicle occupancy of commuting trips by employees by not less than 25 percent of the average of such occupancy in the area at the time the program is developed. If the employer spends an amount equal to the cost of providing each employee a parking space at the workplace and does not achieve the required increase in ridership but shows that such an increase is not feasible, the requirement of the bill will be considered to have been met.

Requirements for extreme areas. (New section 183 of the Act).—An extreme area must comply with all the requirements for moderate, serious, and severe areas, and with the following additional requirements:

The boundaries of extreme areas are defined to be the MSA or CMSA plus 25 miles, unless the State can show that sources in one portion of the area do not contribute to violations of the standard and there is a geographic basis for excluding that portion.

Major stationary sources of VOCs are defined to be sources that emit ten or more tons. Reasonably available control technology must be applied to every source of VOCs or NO_x that emits ten or more tons. Reductions of 12 percent every three years in emissions of NO_x must be achieved.

Non-self generating areas. (New section 183 of the Act).—An ozone nonattainment area that does not contain and is not adjacent to an MSA or CMSA, if determined by the Administrator to be a non-self-generating area, need only comply with the requirements of new section 182 of the Act applicable to all ozone nonattainment areas and any additional requirements promulgated by the Administrator. An area is non-self-generating if the sources of VOCs and NO_x in the area do not make a significant contribution to ozone in that area or any other area.

Sanctions for failure to comply or attain. (New section 184 of the Act).—If a State fails to submit an approvable SIP revision, the Administrator must impose a moratorium on construction or modification of major stationary sources of ozone-forming pollutants in the area; the Secretary of Transportation must limit the use of Federal highway funds to projects that will improve air quality, and the Administrator may withhold State air pollution grants.

If a State fails to implement a SIP, the same sanctions as for failure to submit an approvable plan apply. If a State fails to meet the interim percentage reductions in emissions of VOCs, or, in the case of an extreme area, NO_x, the construction moratorium and highway fund limitation apply. The Administrator is given authority to lower the threshold emissions amount that defines a source as a major stationary source for that area and to require the area to comply with the requirements of the next most stringent ozone classification category.

If an area fails to attain the ozone standard by the date required by law, the Administrator must reclassify the area to the next most stringent category and assure that the fee on major stationary sources is implemented in serious, severe and extreme areas.

Additional Federal ozone control measures. (New section 185 of the Act).—The Administrator is required to publish twelve new control technique guidelines (CTGs) for categories not previously covered and to review new and existing guidelines at least every four years to determine if they should be updated.

The Administrator is required to publish a CTG for VOCs emitted during the loading and unloading of petroleum products from vessels.

The Administrator is required to submit a study to Congress on emissions from commercial and consumer solvents and within two years after submitting the study, to promulgate regulations applicable to categories of these solvents that will achieve a three percent reduction in nationwide emissions of VOCs.

The Administrator is required to promulgate regulations under the Solid Waste Disposal Act to control emissions of VOCs from treatment, storage and disposal facilities that will achieve reductions of four percent in nationwide emissions of those compounds.

Control of interstate ozone pollution. (New section 186 of the Act).—The bill establishes a northeast ozone transport region consisting of the States of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Virginia and the District of Columbia and gives the Administrator authority to add States or portions of a State to the region or to establish additional regions if the Administrator determines that air pollution from the States or portions to be added contribute significantly to ozone pollution in a serious, severe or extreme nonattainment area.

Within six months of enactment, the Administrator is to establish an ozone transport commission for the northeast region consisting of an air pollution control official appointed by the Governor of each State, the Administrator or a designee, and the regional administrator or designee for each EPA region containing any part of the ozone region. Decisions of the commission are to be by a majority vote of members other than EPA regional representatives.

All areas in each State in the ozone transport region are required to apply reasonably available control technology to all sources covered by control technique guidelines issued both before and after the date of enactment of the bill and to noncovered VOC sources that have the potential to emit one hundred or more tons. All areas must also implement Stage II controls at service stations that dispense more than twenty thousand gallons of gasoline per month, and all MSA's with a population of 100,000 or more must establish vehicle I/M programs. The Stage II requirement does not apply to a State that has no ozone nonattainment areas unless the Administrator determines that the controls are needed to bring about attainment in an area in an adjoining State or the Governor of the State with no nonattainment areas determines, pursuant to State law, that the requirement should apply in that State. Also, the Administrator may exempt any area within a State from the requirements of the bill applicable to the ozone region if the State demonstrates that sources within the area do not contribute to nonattainment in any other area in the ozone region.

The commission may develop a plan of additional control measures to be applied within all or part of the region if it determines that the measures are needed to bring any area in the region into attainment. The plan must be transmitted to the Administrator who, after publishing it and giving opportunity for written comments for ninety days, must, within one hundred twenty days after receipt either approve, disapprove or partially approve and partially disapprove, the plan. The Administrator must publish the decision and must explain why any disapproved part is not necessary to achieve attainment in any area in the region. For any approved plan or part of a plan, the Administrator must require any part of the region to which the plan applies to revise the applicable SIP to include the approved control measures in the commission's plan.

The commission may exempt a State or portion of a State from the region if the commission determines that the State or portion will not contribute significantly to ozone nonattainment in any area.

DISCUSSION

Classification of ozone areas.—Any area the ozone design value of which is 0.18 ppm but less than 0.264 ppm is classified as a severe area. Any area the design value of which is below 0.18 but greater than 0.144, for example an area whose design value is 0.179, is classified as a serious area. The following list shows which areas would be classified as extreme, severe, serious or moderate, respectively, under new section 181 of the Act, based on ozone data from 1986–88. Several changes in the classification of particular areas could occur, depending upon air quality in 1990, the probable year of enactment.

CLASSIFICATION OF AREAS VIOLATING OZONE STANDARD

Extreme area

Los Angeles-Anaheim-Riverside, CA.

Severe areas

Baltimore, MD.
Chicago-Gary-Lake County, IL–IN–WI.
Houston-Galveston-Brazoria, TX.
Milwaukee-Racine, WI.
Muskegon, MI.
New York-New Jersey-Long Island, NY–NJ–CT.
Philadelphia-Wilmington-Trenton, PA–NJ–DE–MD.
San Diego, CA.

Serious areas

Atlanta, GA.
Bakersfield, CA.
Baton Rouge, LA.
Beaumont-Port Arthur, TX.
Boston-Lawrence-Salem, MA–NH.
Charlotte-Gastonia-Rock Hill, NC–SC.
Cincinnati-Hamilton, OH–KY–IN.
Cleveland-Akron-Lorain, OH.
El Paso, TX.
Fresno, CA.
Greensboro-Winston Salem-High Point, NC.
Hancock Co, ME (Non-MSA, Acadia).
Hartford-New Britain-Middletown, CT.
Huntington-Ashland, WV–KY–OH.
Kewaunee Co, WI (Non-MSA).
Knox Co, ME (Non-MSA).
Louisville, KY–IN.
Memphis, TN–AR–MS.
Parkersburg-Marietta, WV–OH.
Pittsburgh-Beaver Valley, PA.
Portland, ME.
Portland-Vancouver, OR–WA.
Portsmouth-Dover-Rochester, NH–ME.

Providence-Pawtucket-Fall River, RI.
Sacramento, CA.
Sheboygan, WI.
Springfield, MA.
St Louis, MO–IL.
Visalia-Tulare-Porterville, CA.
Washington, DC–MD–VA.
Worcester, MA.

Moderate areas

Albany-Schenectady-Troy, NY.
Allentown-Bethlehem, PA–NJ.
Altoona, PA.
Anderson, SC (Clemson).
Atlantic City, NJ.
Birmingham, AL.
Bowling Green, (KY Non-MSA Edmonson).
Buffalo-Niagra Falls, NY.
Canton, OH.
Charleston, WV.
Columbia, SC.
Columbus, OH.
Dallas-Forth Worth, TX.
Dayton-Springfield, OH.
Detroit-Ann Arbor, MI.
Erie, PA.
Essex Co, NY (Non-MSA).
Evansville, IN–KY.
Fayetteville, NC.
Grand Rapids, MI.
Greenbriar Co, WV (Non-MSA).
Greenville-Spartanburg, SC.
Harrisburg-Lebanon-Carlisle, PA.
Huntsville, AL.
Indianapolis, IN.
Jacksonville, FL.
Jefferson Co, NY (Non-MSA).
Johnstown, PA.
Kansas City, MO–KS.
Knoxville, TN.
Lafayette-West LaFayette, IN.
Lake Charles, LA.
Lancaster, PA.
Lewiston-Auburn, ME.
Lexington-Fayette, KY.
Lincoln Co, ME (Non-MSA).
Manchester, NH.
Miami-Fort Lauderdale, FL.
Modesto, CA.
Montgomery, AL.
Nashville, TN.
Norfolk-Virginia Beach-Newport News, VA.
Owensboro, KY.
Paducah, KY (Non-MSA inc. Livingston).

Phoenix, AZ.
Poughkeepsie, NY.
Raleigh-Durham, NC.
Reading, PA.
Richmond-Petersburg, VA.
Salt Lake City-Ogden, UT.
San Francisco-Oakland-San Jose, CA.
Santa Barbara-Santa Maria-Lompoc, CA.
Scranton-Wilkes-Barre, PA.
South Bend-Mishawaka, IN.
Stockton, CA.
Sussex Co, DE (Non-MSA).
Tampa-St. Petersburg-Clearwater, FL.
Toledo, OH.
Tulsa, OK.
Waldo Co, ME (Non-MSA).
York, PA.
Youngstown-Warren, OH and Sharon, PA.

The bill in section 181(c) provides final deadlines by which areas must attain the standard. The generic requirement in section 172(a) for attainment as expeditiously as practicable, of course, applies to attainment of the ozone standard. For example, if a severe area can attain the standard in less than fifteen years, it must do so.

Inventories.—The need for improved inventories of all actual emission of VOCS and NO_x is discussed in the report language describing section 102 of the bill. Initial inventories are to be submitted within one year of enactment for the most recent year feasible and in no event for a year earlier than 1987. Revisions are required to be submitted every three years. Owners or operators of every stationary source of VOCs or NO_x must submit annual statements showing actual emissions from each source. If the Administrator issues guidelines, as required under new section 108(g)(2) of the Act, and a State provides an inventory, based on those guidelines, for sources emitting less than 25 tons annually in a class or category, the owners or operators of sources that are in that class or category and that emit less than 25 tons per year do not have to submit annual inventory statements.

Implementation of existing SIP provisions.—The bill requires all ozone nonattainment areas within 18 months of enactment to "fully implement" all provisions of a SIP which have been approved by the Administrator. There have been instances where SIPs demonstrating attainment were submitted and approved, but where certain requirements in the SIPs that were part of the basis for the demonstration of attainment have never been implemented. These provisions have already been through the proposal and approval stages; thus, implementation will not require the time for the administrative process usually involved in SIP submissions and approvals. Where no timetable was established in the approved provision for the effective date of the requirement, the bill requires implementation within eighteen months. Where an approved provision, by its own terms, allows sources a specified time to meet requirements, as is the case with certain rules adopted by the South Coast Air Quality Management District in California, the term "fully implement" does not shorten the time provided in the rule for compliance.

Mobile and stationary source fees.—The annual vehicle registration and stationary source fees required by the bill, which are to be collected beginning six months after the date the SIP revision prescribing them is required to be submitted, are intended to provide resources to meet the greatly increased responsibilities the bill imposes on State and local agencies with jurisdiction over air pollution control. Increased costs will be associated with the improved and ongoing inventories required, with anticipated enhancement of monitoring requirements, with the use of more sophisticated modeling, with the increased number of sources that will be subject to regulation, and with improved mobile source analysis and planning. Without any of these added functions, an EPA "Air Resources Study," dated January 1989, estimated that just to carry out all existing requirements of the Act, an additional 25 to 50 percent increase in resources would be needed by State and local agencies.

A reasonable estimate of funds that would be raised by the $75 per ton fee imposed on VOCs and NO_x is $130 million and $164 million, respectively, on an annual basis. The vehicle registration fee would raise an estimated $200 million. The bill, thus, requires fees roughly proportionate to the contributions mobile and stationary sources make to the ozone problem.

The fees are to be collected by the agency the State determines is the best suited to do so and are required to be allocated to the agencies with responsibility for developing, implementing, and enforcing requirements applicable to the nonattainment areas in which the fees are imposed. If the State fails timely to submit the SIP revision prescribing the fees, or if the State (or local agency) fails adequately to collect the fees, EPA may collect the fees.

Vehicle Inspection and Maintenance.—The bill establishes guidelines for enhanced motor vehicle inspection and maintenance (I/M) programs, and requires that these programs be adopted in several classes of nonattainment areas with population greater than 100,000. The bill requires enhanced I/M programs to test all light-duty vehicles for emissions of volatile organic compounds (VOCs) and oxides of nitrogen (NO_x) in serious, severe, and extreme ozone nonattainment areas. These programs are also required in each moderate nonattainment area with an ozone design value above 0.13 parts per million and an existing or approved but not operating I/M program. The bill also requires carbon monoxide nonattainment areas to adopt an enhanced I/M program that tests all light-duty vehicles for CO emissions.

The enhanced I/M programs required by the bill must be capable of reducing VOC emissions by 4,700 tons and CO emissions by 52,000 tons, from emissions that would have occurred in the year of enactment in the absence of any I/M program, for each million vehicles inspected. The Administrator is authorized to adjust the performance standard for VOCs with respect to areas in California if the Administrator finds that characteristics of the fleet of vehicles operating in the year of enactment in those areas justify a different standard.

The following elements are specified for enhanced I/M programs:

—Visual inspection to detect evidence of tampering and misfueling;
—Computerized emissions analysis;
—Monitoring of the onboard emission diagnostic systems required on vehicles by Environmental Protection Agency regulation under the authority of section 205 of the bill;
—A $200 minimum vehicle repair expenditure required prior to waiver, if a repair waiver provision is included in the State's program;
—Enforcement through denial of registration to vehicles failing inspection or, if an alternative enforcement method was in place prior to enactment, that method may be continued if it can be shown to the Administrator to be more effective.

Nonattainment areas were required by the 1977 Clean Air Act Amendments to implement I/M programs as a condition for receiving an extension of their attainment deadlines beyond 1982. There are currently seventy-one I/M programs operating in 35 States and the District of Columbia. But Environmental Protection Agency regulations leave wide discretion to the States to design their own programs, and these programs vary considerably in their effectiveness. The standard features established by the bill increased the likelihood that all I/M programs will detect improperly functioning vehicles and that these vehicles will be repaired.

Testing for NO_x emissions is added to the programs required in ozone nonattainment areas because of this pollutant's role in ozone formation, as well as its contribution to acid deposition, particulate pollution and its direct health effects. Visual inspection of components, and, on new vehicles, monitoring of onboard diagnostics, are the means expected to be used to reduce instances of excessive NO_x emissions.

All inspections are required to include tests for tampering and misfueling and to require repairs where these activities are detected. This requirement is included because it has proven to be effective for reducing the prohibited activities. For example, EPA has found that in areas without I/M programs, fourteen percent of all passenger vehicles have been subjected to fuel switching; this figure drops to ten percent with an I/M program and to 6 percent with I/M and anti-tampering checks. Anti-tampering inspections can be effectively accomplished by a physical inspection of the engine and exhaust system by trained personnel.

Because EPA has found that decentralized inspection programs using only manual analyzers are less effective than other alternatives, subject to abuse and error, and make enforcement difficult, the bill requires inspections to be made using computerized analyzers that greatly reduce the problems associated with emissions analysis, particularly in a decentralized setting. Strict accounting and audit controls will still be necessary to assure maximum emission reductions.

The Office of Technology Assessment estimates that enhanced I/M programs can reduce tailpipe VOC emissions by 29 percent and NO_x emissions by 14 percent. If implemented in all ozone nonattainment areas, such programs would eliminate about 220,000 tons of VOCs and 190,000 tons of NO_x per year in 1994. These reductions would cost between $2,100 and $5,800 per ton of VOCs and between \$1,200 and \$3,300 per ton of NO_x, according to the OTA analysis. Sierra Research, Inc. reports from an analysis of the California I/M program that the enhanced I/M requirement would cost, on average, including repairs, about \$34-54 per vehicle each year. But repair costs per vehicle would be likely to decline after the program is in operation for several years, since cars would be in better repair and more would pass inspections.

Stage II.—Under the bill, all serious, severe, and extreme areas must require Stage II vapor recovery systems at service stations that sell or dispense more than 20,000 gallons of gasoline per month, determined on the basis of average monthly sales over the 24-month period prior to the date of enactment (or shorter period if the station was not in operation for that period). Moderate areas with a design value above 0.13 parts per million must adopt either a Stage II program or an enhanced vehicle I/M program. The Stage II program requirement can be waived once the Administrator finds that onboard vapor recovery controls are in "widespread use throughout the motor vehicle fleet." This requirement applies to the station owner or operator, who is subject to penalties for failure to implement a State II system, not individual customers of the station.

Stage II vapor recovery systems employ dual hoses to capture hydrocarbon emissions during vehicle refueling. The vapor displaced by liquid fuel entering the vehicle tank from the first hose is taken back to the station's underground storage tank by the second hose. Vapor is prevented from escaping into the atmosphere by a flexible rubber "boot" at the juncture of the vehicle's fillneck and the dispensing nozzle. Vapor recovered in this manner is an economic benefit to the service station owner.

Stage II requirements have already been adopted for the States of California and New Jersey and for parts of Missouri, New York, and the District of Columbia. Stage II programs are planned in Massachusetts.

Stage II systems are a cost-effective way to reduce VOC emissions in nonattainment areas. A recent report by the Office of Technology Assessment found that Stage II systems installed in all nonattainment areas would decrease VOC emissions at a cost of \$1,000 per ton, while the EPA estimates that Stage II emissions reductions would cost \$910 per ton. This cost is equal to about half a cent per gallon of gasoline sold, according to the California Air Resources Board.

Recent analysis by Sierra Research, Inc. indicates that the EPA cost estimate might be too high. The Sierra Research analysis found that the agency overestimated the number of stations in metropolitan areas that would be subject to Stage II requirements and underestimated the control efficiency of Stage II equipment. From actual experience, the Missouri air pollution control program reports that Stage II systems installed in the St. Louis area reduce VOCs at a cost of \$650 to \$700 per ton.

Two other benefits attributable to Stage II systems are reduced human exposure to toxic compounds and increased safety at service stations. Based on epidemiological and animal studies EPA has concluded that gasoline vapor, including benzene, is a probable carcinogen. As a safety measure, a 1987 report by Failure Analysis Associates found that State II systems can prevent about half of all gasolne fires (both refueling and non-refueling) at gas stations.

The EPA estimates that Stage II systems can be fully installed at service stations in nonattainment areas within three years. With at least twelve to fifteen years required before the full benefit of the vehicle ("onboard") vapor recovery program—which is required under section 203 of the bill—will be realized, the substantial reductions in VOCs and toxic emissions in the interim from Stage II is highly desirable.

The inconvenience and difficulty associated with earlier versions of Stage II systems have been resolved. A 1984 study conducted by Sierra Research, Inc. of California's State II program reported the following findings:

> As the emissions control performance of Stage II systems has improved, so has customer acceptance of the systems. California regulations require the posting of toll-free telephone numbers at service stations equipped with Stage II systems. Motorists are encouraged to report any problems they are having with the systems. While 1st generation systems generated numerous complaints, the level of complaints had dropped to one per 200,000 refuelings by 1982.
>
> Based on hundreds of interviews the authors have conducted, the average user of self serve gasoline stations would prefer to use conventional nozzles. However, most motorists consider the difference between conventional and Stage II nozzles to be totally acceptable, especially if they are aware of the fact that the Stage II nozzles reduce air pollution. Many motorists actually prefer the Stage II systems because they substantially reduce gasoline odors and prevent spitback from the fillpipe.

The California Air Resources Board has now certified third generation Stage II nozzles which Sierra Research finds to have "been improved to the point where the systems are of equivalent weight to conventional nozzles and the pressure required to compress the nozzles 'boot' is now minimal."

Periodic emissions reductions.—When the 1977 Clean Air Act Amendments were passed they included a requirement that nonattainment areas acheive "reasonable further progress" which was defined as "annual incremental reductions in emissions . . . which are, in the judgment of the Administrator, to provide for attainment of the applicable national ambient air quality standards by" the required deadline. The expectation that annual emissions reductions would be achieved proved optimistic. Instead, SIPs were submitted that "demonstrated" attainment by a deadline 5 or 10 years away with few interim checkpoints to determine whether progress was, in fact, being made. For numerous reasons, including the lack of periodic assessments capable of showing that progress was not what was predicted, one hundred and two areas of the country are still not achieving the ozone health standard.

The bill addresses the previous lack of intermediate checkpoints in a number of ways. First, areas classified as serious, severe and extreme are required to submit SIPs demonstrating how they will achieve VOC emissions reductions of 12 percent every three years until they reach attainment. Emissions reductions resulting from any control requirement other than the reduced gasoline volatility requirement under new section 211(h) of the Act may be counted toward the required reductions. If, based on inventories submitted every three years or any other information the Administrator requires, it is found that an area has failed to achieve the emissions reductions, sanctions will be imposed, as provided in new section 184 of the Act. Reductions in emissions of NO_x, other than reductions resulting from the Federal motor vehicle control program, can be substituted for VOC emissions reductions on at least a one-for-one basis—that is, at least one tone of NO_x must be reduced to get credit for one ton of VOC reductions—if the resulting ozone reductions will be at least equivalent to those resulting from reducing VOCs by the required percentage.

Second, each serious, severe or extreme area is required to submit annual reports to EPA describing the provisions that have been adopted or become effective during the preceding year and any failure to adopt or finally implement any measure that was scheduled in the SIP for that year. This should provide both the State and EPA with an early warning of delays or areas where changes or compensating new programs will be needed.

Third, the bill requires the State to track trends in patterns of vehicle use in serious, severe and extreme nonattainment areas to determine whether actual miles of vehicle travel conform to the estimates of vehicle miles of travel (VMT) used to calculate mobile source emissions for future years. When the initial plan revision required by the bill is prepared, the States are required to develop an inventory of mobile source emissions as part of the inventory required for the nonattainment area. Mobile source inventories are to be based on measured VMT (or estimated VMT if a reliable measurement system is not in operation) within the nonattainment area and emissions factors provided in guidance issues by the Administrator for the mix of vehicles and travel conditions found in the nonattainment area. This initial inventory should be used as the baseline against which emission reductions required for attainment of the national ambient air quality standards and the percentage reductions required during each three-year period must be measured.

The plan for each nonattainment area should identify the sources from which required emission reductions will be obtained and the emissions expected from all other sources in the area. Regardless of whether a plan relies on reductions in emissions from mobile sources within the nonattainment area in order to demonstrate attainment or to achieve the percentage reductions required for one or more of the three-year milestones, the plan must include the basis for determining what mobile source emissions are expected to be at the end of each three-year period and at the attainment date. This initial determination of expected mobile source emissions for each such checkpoint will include, at a minimum, the expected VMT during the reference year, the expected level of service on arterial, collector and regional roadways along with expected vehicle speeds, and expected emissions factors for the expected mix of vehicles in nonattainment area. The values selected for each of these factors must be consistent with the values used by the metropolitan planning organization, the Federal Highway Administration and the Urban Mass Transit Administration for the design and approval of regional transportation plans and projects in the area.

To make the demonstration required by subparagraph (4)(B), the State should implement a regional VMT monitoring system designed to provide reliable and accurate measurements of actual daily VMT, vehicle speeds and other factors relevant to determining mobile source emissions in the nonattainment area. The monitoring system should be included in its initial plan revision and conform to guidelines for VMT monitoring systems adopted by the Administrator under section 108(e).

In the annual report following each three-year period, the State must include data from the regional VMT monitoring system to demonstrate whether the actual emissions from mobile sources in the nonattainment area exceed the estimates used in the selection of the strategies designed to achieve the required three-year percentage reductions and the attainment demonstration. Such a demonstration requires that measured VMT and other factors relevant to determining mobile source emissions be reported.

If actual mobile source emissions in the area exceed the projections in the initial plan for any of the milestone years, then the State is required to submit a revision to its plan that includes transportation control measures that will achieve emissions reductions from mobile sources sufficient to comply with the mobile source emission targets adopted in the initial plan.

The bill requires that such plan revision be submitted within one year of the end of the year within which the data are collected and excess mobile source emissions occurred. Thus the State should commence preparation of the plan revision as soon as it identifies the exceedance and not wait until after completion of the annual report.

The bill requires that the plan revision include implementation and funding schedules that achieve expeditious emission reductions in accordance with implementation plan projections. The plan revision should not be limited to attempting to achieve the target level that was exceeded in the last checkpoint year, but, rather, should be aimed at regaining lost ground as soon as possible. At a minimum, the State should adopt measures capable of achieving levels required by the next checkpoint year, taking into account the reasons why previously adopted measures failed to achieve the target levels for the last checkpoint year. If more expeditious measures are available that are capable of making up the shortfall sooner than the next checkpoint year, then those measures should be adopted. The State should also give equal emphasis to longer-term measures needed to correct vehicle use trends or other factors that may contribute to excess mobile source emissions in future checkpoint years.

The requirements of this subparagraph apply whenever the mobile source emission targets of the plan are exceeded. If actual emission reductions from stationary sources are greater than the targets in the initial plan, such excess reductions do not relieve the State from complying with the emission reduction targets assigned to mobile sources in the initial plan unless a comprehensive plan revision is approved by EPA. It is important to continue to implement the mobile source emission targets as part of the overall attainment strategy unless the State can demonstrate that the ambient standard can be obtained with a different mix of strategies.

Any State that fails to submit a timely and complete (including implementation and funding schedules) plan revision under this subparagraph is subject to the sanction provisions for failing to submit an approvable SIP.

Reasonably available control technology (RACT).—Serious and severe areas must require sources emitting twenty-five tons or more of VOCs or one hundred tons or more of NO_x to install RACT.

For an extreme area, VOC and NO_x sources that emit ten or more tons must install RACT. While provisions under current section 172 of the Act require installation of reasonably available control technology, the requirement has not been uniformly implemented. Most nonattainment areas have relied on the issuance of control technique guidelines (CTGs) by EPA to determine what constitutes RACT and have not ventured beyond the sources covered by CTGs or the levels of control in the guidelines in an effort to comply with the "reasonably available control technology" provision of the Act.

The bill makes clear that State and local agencies are not authorized to ignore controls on NO_x and VOC sources for which no CTG has been issued. Sources of the size specified in the bill must be controlled to levels achievable through the use of measures that are technologically and economically feasible for a class or category of sources. RACT is not a "lowest common denominator" standard and does not mean that every source in a category must be economically and technically capable of complying with the requirement. Rather, RACT should be achievable by the majority of sources in a category. With respect to VOC sources, a minimum standard of 80 percent reduction from uncontrolled levels is achievable and requirements that get less than that level should be based on documentation of the technical or economic infeasibility of the presumed minimum 80 percent requirement.

Transportation control measures (TCMs).—Severe and extreme areas are required to offset growth in vehicle miles traveled by implementing the transportation controls listed in revised section 108(f) of the Act in accordance with EPA guidance on means for implementing, and the emissions reductions potentials of, the measures. If a State or local agency can show that the adoption of measures (other than any already required by the Act) other than one or more transportation measures will result in comparable emissions reductions, or that such reductions are not needed to provide for timely attainment, then the agency may choose not to implement that (or those) TCMs.

The provision in the bill allowing the State or local agency to present reasons why a reduction from a particular transportation measure is not necessary to meet the interim emissions reductions requirements of subsection 183(b)(3)(B) of the Act or to attain a national ambient air quality standard is not intended to undermine the bill's requirements that areas must attain the standard as expeditiously as practicable. Pursuant to this requirement, EPA must determine whether such a control measure would permit an area to improve its air quality and attain the primary ambient standard more quickly if it were implemented. For example, for an area to justify not adopting a measure specified in section 108(f), it would have to show that adoption of the measure (or a measure providing comparable reductions) would not reduce the number of exceedances or result in more expeditious attainment of the standard.

Employer vehicle occupany programs.—The bill adds a new provision, to be included in State implementation plans for States containing ozone areas classified as severe or extreme (and also for CO areas classified as serious), requiring certain employers in such areas to implement programs designed to reduce work-related vehicle trips and miles traveled by employees. The purpose of the provision is to require employers of one hundred or more employees in a nonattainment area to provide services, facilities or incentives to encourage employees to share commuting trips. The intent of the provision is to reduce both the number of vehicles on the road during rush hours and the time the remaining cars spend idling or operating at inefficient low speeds, and thereby to reduce emissions of hydrocarbons, carbon monoxide and NO_x.

The bill requires such ares to submit SIP revisions requiring employers of over one hundred employees in the area to achieve no less than a 25 percent improvement in commuting vehicle occupancy above a baseline that is the areawide average for all such trips. The Administrator is required to issue guidance under revised section 108(f) of the Act for implementing this section and may specify baseline occupancy rates that vary depending on portions of nonattainment areas (center city, suburban, etc.) or on differing characteristics among nonattainment areas. Thus, for example, the baseline vehicle occupany rate for center city trips where transit is more readily available might be 1.7 passengers per vehicle while for a suburban area, the baseline rate might be only 1.1 or 1.2.

Each employer is required to submit a plan demonstrating compliance with the provision within two years after the SIP submission.

The bill allows an employer to demonstrate compliance with the requirement even if the 25 percent increase is not achieved if the employer can show that after expenditures have been made on the ridership program equal to or greater than the cost of providing each employee with a parking space at the workplace, the 25 percent increase cannot be achieved.

In determining the cost of providing each employee with a parking space at the workplace, the employer shall either report the actual rental cost of the spaces if provided by a separate entity, or the total of direct and indirect costs incurred by the employer.

The Office of Technology Assessment (OTA) reports that in areas where employer-related programs have been undertaken, some companies have increased the proportion of their employees who do not ride alone to more than 80 percent of their work force. The most far-reaching programs to increase the average ridership during peak periods have been implemented in California. In Los Angeles, a regulation is already in effect to increase average ridership from the current level of 1.13 to a new level of 1.3–1.75 people per vehicle, depending upon the location of the company. The ordinance applies to employers of one hundred or more and affects more than eight thousand businesses. According to OTA, the regulation is expected to reduce the number of private motor vehicle trips made each day by about 10 percent, resulting in VOC emissions reductions of about 4 percent of current highway vehicle emissions.

In Pleasanton, California, a 1984 ordinance set a goal of reducing peak hour commuting traffic by 55 percent from a baseline that assumed everyone drives alone. Employers are expected to achieve a 15 percent reduction in the first year, and additional reductions of 10 percent in each of the next four years. According to OTA, in the second year of the program, only three companies failed to achieve the targeted 25 percent reductions, and twelve companies had already exceeded the fourth year target of 45 percent.

One means to comply with the requirment will be to encourage greater use of mass transit (which counts as an increase in the occupancy of the transit vehicle), thereby decreasing the number of cars on the road. One of the incentives which employers may choose to use to encourage employees not to drive to work is to provide mass transit passes as alternatives to parking spaces. A 1984 study by the Port Authority of New York and New Jersey showed that 64 percent of New York City-bound motorists crossing the Hudson who participated in the survey were subsidized by their employer for the trip, typically through employer-provided parking. The study disclosed that 28 percent of Holland Tunnel work commuters and 26 percent of Lincoln Tunnel work commuters would be willing to switch to public transit if their employer subsidized in whole or in part their mass transit trip.

This Port Authority data underscores the effect of the Federal tax subsidy that the Federal government is providing for parking, and thus for single occupancy auto use, in preference to other transportation modes. An employee may receive free parking from an employer as a tax-free fringe benefit and this Federal subsidy for parking exacerbates urban area congestion. The provision in the bill is a modest attempt to offset some of the adverse environmental effect of this Federal tax subsidy.

According to information provided by the South Coast Air Quality Management District in California, the Los Angeles trip reduction program also results in savings to the employees. For example, the program at ARCO's facility in Los Angeles resulted in estimated annual savings of $1.77 million to the company's 1,475 employees, assuming a savings of approximately $2,000 per employee per year; the annual cost of ARCO of implementing the program is $640,404.

Additionally, the South Coast District concludes that trip reduction programs result in savings to the employee who subsidize parking because they will be paying for fewer employee parking spaces. For example, the District estimates that an administrative center employing 1,259 people and spending $365.500 on employee parking would save $115,000 annually by increasing the number of rideshares by 18 percent. Thus, employer ridership programs appear to make economic as well as environmental sense.

Sanctions.—The consequences for failing to meet various requirements of the Act are specified in new section 184 of the Act. These consequences or "sanctions" are designed to address the problem of dirty air, not primarily as punitive in nature. Thus, the mandatory prohibition on construction or modification of new major stationary sources in areas that have not submitted approvable SIPs, have failed to implement a SIP, or are not meeting interim emission reductions is intended to limit increases in emissions in areas that have demonstrated they are not making progress in reducing emissions that contribute to levels of air that are unhealthy. The provision that requires the Secretary of Transportation to prohibit the approval of certain highway projects and to direct highway funding to projects that improve air quality is similarly intended to assure that new transportation funding is not consciously or inadvertently spent on projects that immediately or in the future increase motor vehicle-related pollution. The discretionary authority for the Administrator to withhold part of all of a State's air pollution control program grant is intended primarily to be used in cases where the State or local agency is not doing its job. Under these circumstances EPA may use the resources to promulgate a Federal implementation plan or otherwise supplement the work being done by such an agency.

The Administrator is given discretionary authority to sanction areas failing to meet interim reduction requirements. The Administrator may apply requirements from the next higher classification; for example, a serious area that fails to meet an interim emission requirement could be subjected to some or all controls applicable to severe areas. The Administrator may also require that controls applicable to major stationary sources be expanded to cover smaller sources.

The bill does not impose construction bans or highway funding limitations for areas that fail to attain the standard. The bill is designed to induce areas to implement all available measures during the period prior to the attainment deadline. If an area does not attain the air quality standard by the deadline, it is required to adopt controls and measures applicable to the next higher ozone classification, and in serious, severe and extreme areas, major stationary sources of VOCs are required to pay a fee of $5,000 per ton emitted in excess of 50 percent of the amount actually emitted in the year the standard was to have been attained. This is an incentive for these sources to reduce the VOCs further; if a source cuts emissions in half, it will no longer be required to pay the $5,000 per ton fee.

Commercial and consumer solvents.—As a result of earlier efforts to reduce the emissions of VOCs in nonattainment areas, most large stationary point sources have achieved significant VOC emissions reductions. As a result of the Federal motor vehicle control program and EPA's recent limit on gasoline volatility to 10.5 pounds per square inch, VOC emissions from mobile sources are expected to continue to decrease in the near future. With the additional provisions in the bill such as gasoline volatility limits at nine pounds per square inch and tighter tailpipe standards, vehicle emissions will continue to go down or at least remain at existing levels over the next decade or two. Thus, in ozone nonattainment areas commercial and consumer solvents, which emit VOCs when they are used, will be the largest uncontrolled sources of VOC emissions. They are already estimated by the OTA to constitute one quarter of all VOC emissions in nonattainment areas.

The bill requires EPA to conduct a two-year study to identify the products which emit VOCs, to estimate the contribution of different products to total VOC emissions, and to identify potential control alternatives and their costs. After completing the study, EPA is to promulgate regulations which achieve a reduction of VOCs equal to three percent of the national inventory of VOC emissions. The Agency is not required to regulate each and every category or product; it should seek to achieve the required reduction in nationwide VOC emissions in the most effective, least disruptive way.

Regulations could take any number of forms. As examples, they could require that existing controls be applied to smaller sources—this would be most appropriate with respect to industrial and commercial use of solvents; they could limit the VOC content in certain solvents; they could specify directions for use, consumption, storage or disposal; or they could impose fees which recoup costs of regulation or charges (not necessarily limited to the costs of regulation) that provide an economic incentive to achieve reduced use of VOCs in products. While EPA has, to date, little experience with controlling emissions from these products, both the South Coast Air Quality Management District and the city of New York have been working for a few years to devise ways to reduce these emissions. EPA can benefit from the work done by others, but it is clear that for certain types of products that are marketed nationwide, innovative action at the Federal level is needed.

Ozone transport region.—Ozone transport is a serious problem for affected nonattainment areas. Peak ozone concentrations occur on successive hot days when ozone forms most rapidly and accumulates over broad regions. Areas in some States may be unable to attain the ozone standard despite implementation of stringent emissions control because of pollution transported into such areas from other States. Areas in States where the pollution is actually generated may, because atmospheric conditions transport pollution out of the region, experience ozone levels that are not as high as they would have been had the pollution remained within the State's borders. Some of these areas may be attaining the ozone standard and yet contribute substantially to ozone levels in downwind areas.

The transport problem in the northeast, and perhaps other regions as well, is serious enough that additional efforts must be made on an interstate basis to control emissions, including emissions from attainment areas.

Control of emissions of nitrogen ozides as well as hydrocarbons is needed to protect against transported ozone problems. A growing consensus exists that NO_x as well as hydrocarbon emissions play a critical role in the formation of ozone and that emissions of both NO_x and hydrocarbons must be reduced to attain air quality which protects public health. Some modeling studies suggest nitric oxide emissions, the major fraction of most NO_x emissions, can act to scavenge ozone and thus reduce concentrations near the source. Other modeling studies and ambient measurements, however, show that farther downwind, the same NO_x can actually enhance ozone formation. A more balanced approach of controlling both VOCs and NO_x regionwide will tend to ensure that ozone improvements near the source is accompanied by ozone improvements in downwind areas. A critical implication of these findings is that without controls on nitrogen oxides the current control policies will simply change the urban ozone problem into a regional one.

The only available empirical evidence of this is from Southern California, where emissions of nitrogen oxides in downtown Los Angeles react with ozone in downtown areas to form excess nitrogen dioxide. This nitrogen dioxide photodecomposes into increased ozone during transport of the polluted air mass from the downtown area into the mountain and desert regions of Southern California.

Transport has been documented in the northeast with EPA time sequence maps. The maps illustrate the typical flow of an ozone plume in the northeast as it moves from New York City into New England. In the early morning, the plume centers were over southern New England. By mid-day the plume extends to central New England, Cape Cod, and western Massachusetts. By late afternoon, the episode pushes toward northern New England. As it moves north, the plume combines with other emissions centers in New England.

According to the 1985 NAPAP inventory, NO_x and hydrocarbon emissions from States directly upwind of the eight States in the Northeast States for Coordinated Air Use Management (NESCAUM) were 100 percent and 79 percent greater, respectively, than the total emissions from the NESCAUM States (Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island and Vermont). NESCAUM estimates that upwind emissions, like emissions in its area, must be reduced by at least 40–50 percent to ensure future attainment of the ozone health standard.

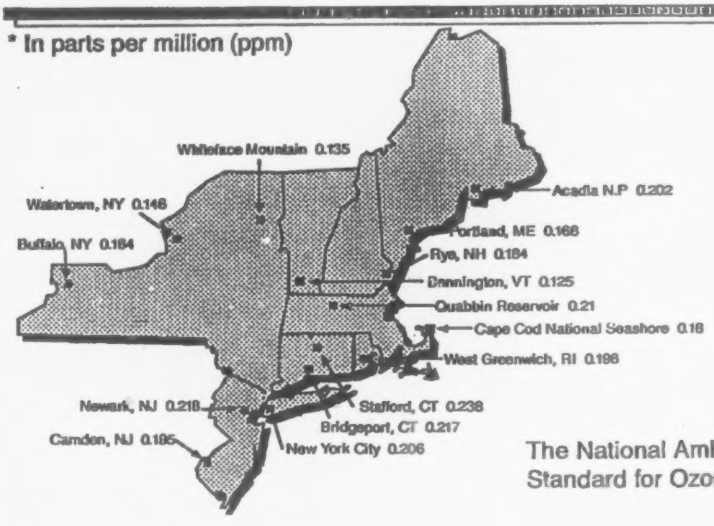
Clear proof of the transport problem is Acadia National Park, which has been a nonattainment area. This popular national park on the coast of Maine attracts visitors because of its vistas and clean air. This area does not on its own produce enough emissions to violate the ozone standard. Much of the air over Acadia travels up the coast through urban centers of the eastern United States. While it is not currently possible to identify with certainty the exact origins of the pollution, control of downwind sources will help assure that this and other national parks meet and maintain compliance with national air quality standards. The map shown in figure 1–1 compiled for the summer of 1988 by NESCAUM illustrates how widespread and severe peak ozone concentrations can be in rural and urban areas.

OMNIMAP is a photochemical dispersion model run for the New York, New Jersey, and Connecticut metropolitan area. The model suggests that even if all emissions sources were eliminated within the tri-state area, violations of the ozone standard would still occur. This means substantial reductions in emissions from areas upwind from the New York metropolitan area must be achieved if this area is to attain the air quality standards.

EPA's Regional Oxidant Model (ROM) is operating and will assist the work of the regional commission. This is a computer-based model of ozone transport patterns for many eastern cities and a tool that should be available to the commission for use in determining where additional VOC and NO_x control measures may be necessary to achieve downwind improvements in air quality. Preliminary EPA regional ozone modeling analyses indicate that achieving the Federal clean air standard for ozone will require substantial emissions reductions within the northeast States by as much as 60 percent for hydrocarbons and a substantial reduction for nitrogen oxides. This is in addition to 30-40 percent reduction in hydrocarbons already achieved.

Figure I-1

High Ozone Levels in the Northeast Summer 1988*


* In parts per million (ppm)
Whiteface Mountain 0.135
Watertown, NY 0.146
Buffalo NY 0.184
Acadia N.P 0.202
Portland, ME 0.166
Rye, NH 0.184
Bennington, VT 0.125
Quabbin Reservoir 0.21
Cape Cod National Seashore 0.18
West Greenwich, RI 0.196
Newark, NJ 0.218
Stafford, CT 0.238
Bridgeport, CT 0.217
Camden, NJ 0.195
New York City 0.206

The National Ambient Air Quality Standard for Ozone Is 0.12 ppm

Source: NESCAUM

ROM and urban-scale photochemical dispersion models are useful tools that should be utilized but they are not the solution to the air pollution problems. There are technical limitations to all models both in precision and in interpretation of the results. Actions that will reduce emissions must occur while studies and modeling continue in order to reduce exposure to ozone in the northeast corridor.

ROM should continue to be a funding priority for EPA until EPA and the States are satisfied that they have gleaned all the useful information from ROM to develop SIPs. In addition, the States will be using urban photochemical dispersion models building upon the information developed by ROM. If EPA needs additional funds to continue to develop and run ROM and assist the States with urban airshed models, then the agency should come forward with a request for additional funds. If EPA has reasons for not continuing to fund projects using these models, notification to States in the ozone transport region and to Congress is warranted.

A regional ozone transport commission is one important way to address these problems identified by modeling and monitoring. State air quality directors in the northeast have been cooperating for several years to develop a regional solution to the ozone problem. Lack of support by EPA and lack of authority to institute needed regional controls (both in attainment and nonattainment areas) have prevented this effort from being more successful. As an indication of the seriousness with which the northeastern States regard the transport problem, the NESCAUM States initiated an effort in 1986 to limit the summertime volatility of gasoline through consistent State regulations. In an action unique in air quality regulation, the State environmental commissioners signed a Memorandum of Understanding in November 1987 agreeing to propose similar State volatility regulations. By Spring, 1989, seven States had promulgated consistent regulations to limit gasoline volatility. These States enforced regulations for the first time this past summer. EPA's final volatility regulation would have reduced emissions in the northeast only half as much as the States' actions achieved.

Another effort at regional cooperation resulted in a consensus on a broader range of control measures. In August, 1988, a Regional Ozone Transport Group (ROTG) was organized by EPA to provide a forum for Federal and State environmental officials to discuss the dimensions of regional oxidant transport in the northeastern U.S. and to explore potential abatement mechanisms. At a July, 1989 meeting of the ROTG, the State representatives from Massachusetts, Connecticut, New York, New Jersey, and Pennsylvania expressed strong support for the ozone strategy set forth in a document entitled "Program Concepts for Northeast Ozone Attainment." The report recognizes that it will be necessary to implement a combination of control measures on national, regional and local levels and that, in light of the apparent magnitude of emission reductions needed and the limited reductions available from identified control options, the risk of over-control is negligible.

The initial list of controls for the northeast transport region reflects the recommendations made by the State ROTG representatives for regional action. They represent reasonable availably cost-effective controls which will reduce ozone precursors throughout the region.

The commission is authorized in the bill to develop plans for imposing additional control measures throughout the region or in selected parts and to submit such plans to the Administrator. The Administrator is to seek comment on any proposed controls and issue a SIP call requiring the areas affected by the plan to revise their SIPs to include the controls unless the Administrator determines the additional controls are not needed in order for any area in the region to attain the ozone standard by the attainment date applicable to that area. The Administrator may require SIPs to include portions of a commission's plan and not others if the latter are not needed to bring about timely attainment in any area.

ADDITIONAL REQUIREMENTS FOR CARBON MONOXIDE NONATTAINMENT AREAS (SECTION 108)

SUMMARY

Section 108 adds a new subpart 3 to part D of title I of the Clean Air Act. Part D was added to the Act in 1977 and includes specific remedial measures for areas which continue in nonattainment for ozone, carbon monoxide and particulate matter. The new subpart 3 specifically addresses the carbon monoxide (CO) nonattainment problem and includes four new sections: section 187 (classification and deadline extensions); section 188 (requirements for all carbon monoxide nonattainment areas); section 189 (requirements for serious carbon monoxide nonattainment areas only); and section 190 (sanctions for failure to implement the requirements of the Act).

Based on 1987 and 1988 air quality data there are 44 areas which currently fail to attain the national primary ambient air quality standard for carbon monoxide which is 9 parts per million (ppm) averaged over eight hours to be exceeded not more than once per year. Section 187 classifies these areas into two groups: 11 serious carbon monoxide nonattainment areas with design values in each area exceeding 14 ppm CO; and the 33 other areas which have design values between 9 ppm and 14 ppm CO. Attainment deadlines are extended for all areas with five additional years granted to moderate nonattaiment areas and ten additional years granted serious carbon monoxide nonattainment areas.

The new section 188 of the Act establishes requirements which will be applicable to both moderate and serious areas. The requirements are to be satisfied by the implementation of various revisions to the State implementation plan (SIP) for each area. A comprehensive inventory of carbon monoxide emissions must be prepared for each area and updated every three years. All commitments contained in current implementation plans which have not been implemented must be in place within 18 months after enactment of the bill. The States must collect an annual auto registration fee of $2.00 from the owner of each vehicle registered in a corbon monoxide nonattainment area. Major stationary sources located in these 44 areas will be required to pay a fee of $75 for each ton of carbon monoxide emitted. Revenues from these fees will be used by the State or local air pollution control agency to develop and carry out the implementation plan for the area. Major stationary sources (50 tons/year of CO in moderate areas; 25 tons/year of CO in serious areas) are required to obtain an operating permit.

Not later than two years after enactment of the bill, each State containing a carbon monoxide nonattainment area must submit to the Administrator a completely revised State implementation plan for each area which includes the measures necessary to demonstrate that the area will attain the standard by the newly established deadlines. In addition to the attainment demonstration, these revised SIPs must also include interim milestones expressed in quantitative terms and contingency measures (standby emissions reduction regulations), which can be implemented promptly, if an interim milestone is missed. The Administrator is to audit each SIP every three years to assure that the SIP is being fully implemented and that milestones are being met.

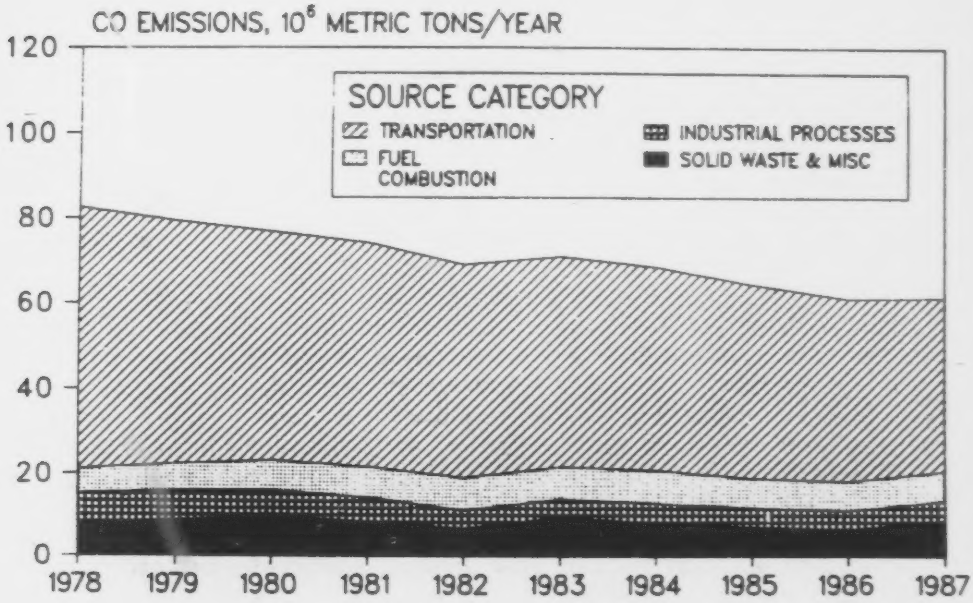
FIGURE I–2.—NATIONAL CARBON MONOXIDE EMISSION ESTIMATES, 1978–87

[Million metric tons/year]

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Source category:										
Transportation	61.6	56.9	53.5	52.5	50.0	49.3	47.6	45.5	42.8	40.7
Fuel combustion	5.8	6.6	7.3	7.5	8.0	7.9	8.1	7.2	7.2	7.2
Industrial processes	7.2	7.1	6.3	5.9	4.4	4.4	4.8	4.6	4.5	4.7
Solid waste	2.5	2.3	2.2	2.1	2.0	1.9	1.9	2.0	1.7	1.7
Miscellaneous	5.7	6.5	7.6	6.4	4.9	7.7	6.3	5.3	5.0	7.1
Total	82.4	79.4	77.0	74.4	69.4	71.3	68.7	64.6	61.1	61.4

Note.—The sums of sub-categories may not equal total due to rounding.

Figure I-3



National trend in emissions of carbon monoxide, 1978-1987.

All carbon monoxide nonattainment areas must also include an enhanced vehicle inspection and maintenance program and an oxygenated fuels program in their revised SIPs.

In addition to the requirements imposed by section 188, the new section 189 also requires the 11 serious carbon monoxide nonattainment areas to implement the transportation control measures specified in section 108(f) of the Act and a program to increase the vehicle occupancy rate in worktrips which is to be implemented by major employers (those employing more than 100 persons) in each of these serious nonattainment areas.

Section 190 imposes sanctions for failure to implement the requirements of this subpart and provides for the reclassification and preparation of SIP revisions for areas which fail to attain the standard by the prescribed date. Carbon monoxide nonattainment areas for which States fail to submit SIP revisions, fail to implement SIP requirements, or fail to meet periodic milestones will be subject to a ban on the construction of new major stationary sources and restrictions on the use of highway funding. The Administrator may also withhold air pollution control grants from States containing such areas. Moderate areas failing to meet the standard within five years are to be reclassified as serious areas and must upgrade their SIPs to include the mandated transportation control measures and an employee ridesharing program. Serious areas failing to attain the standard within 10 years must submit SIP revisions demonstrating a five percent annual reduction in carbon monoxide emissions for the area until such time as the standard is attained.

DISCUSSION

Section 187.—This legislation adds a new section 187 to part D of the Act. The provisions of this new section address the preparation and revision of State implementation plans and are discussed in more detail below. The section classifies carbon monoxide areas as moderate or serious, extends attainment deadlines for areas currently in nonattainment, and provides for the implementation of a revised carbon monoxide standard should it be promulgated.

Classification.—The national primary ambient air quality standard for carbon monoxide has two parts. There is a standard of 9 ppm CO averaged over eight hours and a standard of 35 ppm averaged over one hour. Only one area in the nation currently exceeds the one-hour standard and it also exceeds the eight-hour standard. Classification as "moderate" or "serious" pursuant to this section is to be made on the basis of the eight-hour standard.

The proposed section 187 will classify carbon monoxide nonattainment areas into one of two groups: moderate nonattainment areas and serious nonattainment areas. The classification is based on the design value for each area using air quality data for the two calendar years immediately preceeding enactment of the legislation. The carbon monoxide design value is the highest second annual maximum reading during this two-year period, as the standard allows an exceedance on the average once each year. (That is—the highest value in each year does not count in classifying areas; it's the higher of the second highest readings in each of the most recent two years which determines the design value.)

Section 187 provides that areas with design values exceeding the standard by more than 55 percent (a design value of 14 ppm CO averaged over eight hours) are to be classified as serious carbon monoxide nonattainment areas. All other areas not attaining the carbon monoxide standard are to be considered moderate nonattainment areas.

The classification is to be made using air quality data from the two years immediately prior to enactment of the legislation. If in subsequent years, the design value for an area changes (either increasing or decreasing) the classification remains the same with two exceptions. If a moderate area fails to attain within five years, it is reclassified as a serious area no matter the extent of the exceedance. And if an area which is currently in attainment subsequently exceeds the standard, it is to be classified as moderate or serious at the time of the exceedance based on the percentage by which the standard is exceeded.

The following list of areas classified as moderate or serious is based on air quality data for 1987 and 1988. Therefore, it will not accurately reflect the classification that will be made by the bill which is to be based on 1988 and 1989 data (if the bill is enacted in 1990). There has been considerable change in the number of CO nonattainment areas and their design values in recent years due to improvement in tailpipe emissions from the new automobile fleet. For instance, the 1989 update (using 1987 and 1988 data) led to the deletion of 12 cities from the nonattainment list which was published in 1988.

SERIOUS AREAS

Area	Design value 1987–1988
Albuquerque, NM	16.3
Denver-Boulder, CO	16.2
El Paso, TX	15.4
Las Vegas, NV	14.4
Los Angeles-Anaheim-Riverside, CA	19.6
New York-New Jersey-Long Island, NY–NJ–CT	19.6
Phoenix, AZ	15.5
Seattle-Tacoma, WA	14.8
Spokane, WA	19.0
Steubenville-Weirton, OH–WV	30.3
Winnebago Co., WI	19.9

MODERATE AREAS

Area	Design value 1987–88
Anchorage, AK	11.8
Baltimore, MD	9.5
Boston-Lawrence-Salem, MA–NH	9.8
Chico, CA	10.4
Cleveland-Akron-Lorain, OH	10.1
Colorado Springs, CO	11.8
Fairbanks ED, AK	13.9
Fort-Collins-Loveland, CO	12.8
Fresno, CA	13.0
Great Falls, MT	11.0
Greely, CO	10.5
Greensboro-Winston Salem, NC	9.7
Hartford-New Britain-Middletown, CT	11.4
Josephine Co., OR	10.3
Klamath Co., OR	10.5
Manchester, NH	10.3
Medford, OR	11.3
Memphis, TN–AR–MS	10.5
Minneapolis-St. Paul, MN	13.3
Missoula, MT	10.6
Modesto, CA	9.7

MODERATE AREAS—Continued

Area	Design value 1987–88
Oklahoma City, OK	11.4
Portland-Vancouver, OR–WA	12.0
Provo-Orem, UT	13.3
Raleigh-Durham, NC	10.0
Reno, NV	9.9
Sacramento, CA	12.5
Salt Lake City-Ogden, UT	9.8
San Diego, CA	9.5
San Francisco-Oakland-San Jose, CA	10.3
St. Louis, MO–IL	10.5
Washington, DC–VA–MD	11.4
Yakima, WA	10.9

Data and methods for classification.—Air quality data used to determine the appropriate classification of an area (as either a moderate or serious carbon monoxide nonattainment area) are to be collected and analyzed under the same rules which have been applicable in determining whether an area has attained the standard. Classifications are to be made using the most recent area quality information (most probably covering the years 1988 and 1989) and the Administrator is to publish a list of carbon monoxide nonattainment areas noting the appropriate classification 30 days after enactment. This listing is a ministeial function, as the classification is accompanied by enactment of the legislation.

Deadlines for attainment.—Section 187 extends the deadline for carbon monoxide nonattainment for a period of five years from the date of enactment of the bill for areas classified as moderate carbon monoxide nonattainment areas and for a period of ten years for areas classified as serious carbon monoxide nonattainment areas. These are the outside dates by which attainment is to be demonstrated in implementation plans. Provisions in other sections of the Act which require attainment as expeditiously as in practicable are still applicable and areas which can demonstrate attainment before the deadline (making reasonable further progress as determined by the Administrator and on a schedule to meet interim milestones which are prescribed in the plan) shall do so.

New standard.—Section 187 also contains provisions to assure that the carbon monoxide program will stay on track even if the national primary ambient air quality standard for carbon monoxide should be modified. Recent evidence published in medical journals suggests that the current standard of 9 ppm CO averaged over eight hours may not provide an adequate margin of safety to protect public health. Evidence of this kind may require the Administrator to revise the standard downward.

In revealing the standard, however, the Administrator will not be disturbing the requirements, including the attainment deadlines, established by this subpart. Other sections of the Act establish generic provisions for SIPs and SIP revisions. They do not apply here. The purpose of subsection (d) of section 187 is to assure that additional extensions are not provided to areas in nonattainment for the current standard (as the result of a revision in the standard) and that the stringency of the requirements which must be implemented in such areas is not diminished, even if the carbon monoxide standard is revised.

Section 188.—The bill adds a new section 188 to part D of the Act. The new section includes requirements applicable to the State implementation plans for all areas which are designated nonattainment for carbon monoxide. These requirements include: inventories of emissions; monitoring programs; prompt implementation of existing SIP provisions; an auto registration fee; a stationary source emissions fee; permit requirements for stationary sources; a requirement that revised SIPs demonstrating attainment by the newly established deadline be submitted; periodic audits of SIPs; enhanced vehicle inspection and maintenance; and an oxygenated fuels program. Each of these provisions is described in more detail below.

The continuing failure of many areas to attain the standard after 20 years of effort under the Clean Air Act is due to many causes including poor planning and enforcement. But in part the failure can be attributed to the data of very poor quality which has been used in the planning process. It is intended that areas which are still in nonattainment commit substantial additional resources to upgrade their inventories (and data collection and estimation methods) before a new round of planning is commenced. Pursuant to the proposed Post-1987 Ozone and Carbon Monoxide Policy which EPA issued late in 1987, many States have begun work on new inventories. Inventories prepared pursuant to that policy for either 1989 or 1990 and which satisfy all other requirements established by the Administrator may be submitted to meet this requirement. Inventories prepared for 1988 must be updated.

Amendments to section 108 of the Clean Air Act made by section 102 of the bill and discussed above require the Administrator to publish new guidance for emissions inventories for nonattainment areas. Section 188 requires that guidance include emissions estimating techniques for small, area sources of CO emissions including wood stoves, residential heating units and other small combustion units.

Section 188 also requires States to include objective and quantitative interim milestones in their revised implementation plans. These milestones may be stated in terms of emissions reductions. But they may also be stated in other terms (including reductions in vehicle miles traveled, in trips or in ambient carbon monoxide levels or exceedances). To the extent that a milestone is to be measured in terms other than emissions reduction, the inventories required by this section should include the necessary data to determine whether the milestone has been achieved.

Monitoring.—Carbon monoxide nonattainment can be a "hotspot" problem with one or only a few small areas within a large metropolitan community exceeding the standard. If stationary monitors are not located near these "hotspots" the problem will not be detected. And even when the monitor is properly located to detect one "hotspot" it is not always possible to determine the extent of the nonattainment problem across the rest of the metropolitan region.

Recognizing this aspect of the cargon monoxide nonattainment problem, section 188 requires States containing carbon monoxide nonattainment areas to use mobile monitoring systems in such area or areas to assure that air quality problem is properly characterized. Guidance by the Administrator under section 108(g) of the Act (as described above in the discussion of section 102 of the bill) will establish methods and procedures for mobile CO monitoring stations. Mobile monitoring is to be commenced in all CO nonattainment areas not later than 18 months after enactment of the legislation.

The Administrator may also require as part of the guidance promulgated under section 108(g) that areas currently designated attainment for carbon monoxide also participate in the mobile monitoring program. This is to assure that "hotspot" problems in those communities are not being overlooked due to the improper placement of stationary monitors.

Existing commitments.—Many States have not fully implemented the provisions included in their implementation plans for nonattainment areas. Commitments to these measures were made when the SIP was last submitted, but EPA has not taken aggressive oversight and enforcement action to assure that all measures proposed have actually been imposed. In fact, in some cases EPA has failed even to review and approve or disapprove measures which have been proposed by the States.

To achieve the earliest possible reductions in unhealthful carbon monoxide pollution, section 188 requires that all measures contained in any SIP, but which have not been implemented, be put in place promptly. If the deadline for the measure, as originally proposed in the SIP, has already passed the measure is to be implemented within 18 months after enactment of the legislation. If the original deadline is later than such date, the deadline applicable to the proposed measure shall continue to apply. Where the requirement is a regulation which has not been promulgated, and which requires stationary sources to make significant modifications to comply, sources shall be granted a compliance period. However, the regulation must be promulgated within 18 months of enactment of the legislation.

With respect to carbon monoxide nonattainment plans only, this requirement applies to SIP provisions whether they have been approved by the Administrator or not. Enactment of the legislation is to be deemed approval or the proposal, unless the Administrator has disapproved the proposed before enactment of the bill. Only those SIP revisions which have been received by the Administrator and have been proposed in a notice and comment rule-making, but have not been approved or disapproved, are deemed approved by this legislation.

Auto registration fee.—Subsection (d) of section 188 requires that each State containing a carbon monoxide nonattainment area submit a revision of its SIP to the Administrator which contains an enforceable requirement that the owner or operator of each vehicle registered within the nonattainment area or areas pay a fee of not less than $2.00 per year. The revenues from these fees are to be used by the State or local air pollution control agency to implement programs which will assure that the carbon monoxide air quality standard is attained and maintained. The SIP amendment must be submitted not later than 18 months after enactment of the legislation and the fee must be collected beginning not later than 24 months after enactment.

The fee is not in addition to the similar registration fee which is mandated for ozone nonattainment areas. If an area is nonattainment for both carbon monoxide and ozone, only one $2.00 fee need be collected. Any State, of course, has the authority to impose a registration fee in greater amounts should it see the need to do so.

In most carbon monoxide nonattainment areas, mobile sources are the principal source of the emissions which cause the standard to be exceeded. In some areas mobile sources account for 90 percent of all CO emissions. The purpose of the auto registration fee is to assure that the owners and operators of the sources causing the problem pay some portion of the cost of the government programs necessary to correct it. Auto registration fees (rather than fuel taxes or inspection and maintenance surcharges) appear to be the most efficient fee collection mechanism to raise the revenues required. All States currently have an annual auto registration fee, so there is no problem with implementation. In fact, some States have already added air pollution surcharges to their auto registration fees.

The legislation does not specify which State agency is to collect the fee, but all of the revenue is to be appropriated to the State or local agency responsible for implementing carbon monoxide air quality programs. The funds may be used to support any and all expenditures which would be eligible for support by a grant under section 105 of the Clean Air Act.

If a State chooses not to impose the auto registration fee required by this subsection in an area or areas, the Administrator is to collect the fee. Revenues from any fee collected by the Administrator are to be placed in a separate fund of the Treasury and may only be appropriated to support the air quality programs of the Environmental Protection Agency.

As noted above there are 104 million vehicles currently registered in ozone or cabon monoxide nonattinment areas. The fees imposed by this section and section 182 should provide $208 million in additional revenue to State and local air pollution control programs. There is no separate estimate of the vehicles registered in areas which are nonattainment for carbon monoxide only.

Stationary source emissions fee.—Each major stationary source of carbon monoxide emissions located in either a moderate or serious nonattainment area must pay a fee to the State of not less than $75 per ton for each ton of carbon monoxide emissions. The fee is to be imposed by a State regulation promulgated as amendment to the implementation plan for the area. The SIP revision must be submitted to the Administrator for approval not later than 18 months after the enactment of the legislation and fee collections must commence not later than 24 months after enactment. Liability for the fee is in addition to any fee for hydrocarbon, oxides or nitrogen, sulfur dioxide, or PM–10 emissions fees which may be imposed under other parts of the Act. It is also in addition to any permit fee which is imposed either by the State or by the Administrator under the Act.

The definition of major stationary source depends on the classification of the area as moderate or serious for carbon monoxide pollution. In moderate areas, major sources are those emitting 50 tons per year or more of carbon monoxide. In serious areas, all sources emitting 25 tons or more per year are considered major stationary sources.

EPA estimates that there are a total of 1,380,000 tons of carbon monoxide emitted each year from major sources in carbon monoxide nonattainment areas meeting these definitions. At $75 per ton, total revenues from the fee should be $103,500,000.

As with the auto registeration fee, the revenues are to be appropriate only to State and local air pollution control agencies with responsibility for air quality control programs. Expenditures can be made for any activity which would be eligible for support under a grant authorized by section 105 of the Clean Air Act.

Permit requirement.—Each major stationary source located in a carbon monoxide nonattainment area is to operate in accordance with an enforceable permit which establishes emissions limitations for the source and other requirements. States containing carbon monoxide nonattainment area is to operate in accordance with an enforceable permit which establishes emissions limitations for the source and other requirements. States containing carbon monoxide nonattainment areas are to submit SIP revisions establishing permit programs not later than 18 months after enactment and operating permits are to be issued to major stationary sources pursuant to such programs not later than 36 months after enactment of the bill. At a minimum each permit shall include a requirement that carbon monoxide emissions be monitored on a continuous basis. Continuous emissions monitors for carbon monoxide are readily available and affordable.

Major stationary sources are defined as facilities in moderate carbon monoxide nonattainment areas which emit or have the potential to emit (before control) more than 50 tons of CO per year and facilities located in serious carbon monoxide nonattainment areas which emit or have the potential to emit (before control) more than 25 tons of carbon monoxide per year.

Section 173(c) of the Act requires new sources to be located in onattainment areas to achieve off-setting emissions reductions before operation is begun. Section 188 requires that offsets for major stationary sources of carbon monoxide locating in serious carbon monoxide nonattainment areas be at least 1.5 to 1. That is, each such source which will emit more than 25 tons per year must identify emissions reductions at least 150 percent greater than it will emit as a condition of receiving a permit to operate in the serious nonattainment area.

Attainment demonstration and milestones.—The new sections 188 and 189 of part D require States to submit a series of SIP revisions for carbon monoxide nonattainment areas at various times. Some of these revisions require specific amendments to the existing SIP (enhanced inspection and maintenance, the fees, the permit program, etc.). The first of these revisions is due a year enactment (enhanced I/M, described below). And many others are due 18 months after enactment.

In addition to these prescribed amendments to SIPs, section 188 also requires each State to submit a comprehensive rewrite of its implementation plan which will include a demonstration of attainment by the applicable deadline and will also include all of the measures (not already approved) which are necessary to demonstrate attainment by that date. This comprehensive revision is to be submitted by the State not later than 24 months after enactment of the legislation. The Administrator is to approve or disapprove the revision within one year. If the Administrator cannot approve the plan (because it does not demonstrate attainment), the Administration may nevertheless require that each of the elements of the plan be implemented and enforced pending approval of additional revisions assuring attainment by the applicable date.

Some areas with very marginal nonattainment problems may forego the formal demonstration required here, provided that they have taken steps to assure attainment at the earliest possible date. This exception is only available for areas which do not exceed the national primary ambient air quality standard for carbon monoxide by more than 10 percent—that is, areas with a design value less than 9.9 ppm CO.

As a further condition for the exception, the Governor of the State in which the area is located must submit information to the Administrator not later than three months after enactment of the legislation which indicates the steps the State is taking or will take which will assure attainment by not later than 36 months after enactment. If the Administrator does not receive a timely submission as provided here, no exception to the planning requirements of this sectionis to be granted.

If a marginal area which has qualified for an exception to the planning requirement imposed here, fails to attain the carbon monoxide standard within 36 months of enactment, then the State in which the area is located must submit a SIP revision meeting all of the requirements of subsection (g) including demonstration of attainment by the date five years after enactment and including implementation of an enhanced vehicle inspection and maintenance program. Requirements for inventories, monitoring, permits and fees apply in all carbon monoxide nonattainment areas including those with design values only marginally exceeding the standard.

State implementation plans have notably failed to achieve the expectations established by the Clean Air Act in 1970 and by the Amendments which were adopted in 1977. Despite the widespread belief that all areas would be in attainment for carbon monoxide by the end of 1987 (a conclusion was supported by extensive air quality modeling in the report of the National Air Quality Commission as recently as 1981), 44 areas including many of the major metropolitan areas of the United States continue in nonattainment today.

One of the reasons for these failed expectations has been the difficulty EPA has experienced in providing oversight for the SIP process. Some of the oversight problem is due to a lack of resources to hire, train and assign personnel in the regional offices to work on enforcement of the air quality program. But part of the problem is also a lack of objective and timely measures against which to determine progress. Because the 1977 Amendments established very long attainment horizons (five and ten years) and no workable set of sanctions to impose on areas which failed to attain by those deadlines, it has not been possible for EPA to appropriately address inadequacies in State implementation plans.

To correct some of these oversight problems section 188 requires the implementation plan for each nonattainment area to include interim milestones which indicate progress toward attainment. These milestones are intended to give quantitative expression for the requirement contained in existing law in section 171 that each area demonstrate reasonable further progress. The milestones are to be established in the SIP for each year in which an inventory update is required pursuant to section 188(a)—that is, every three years.

Section 182 requires that ozone nonattainment plans achieve a reduction in emissions of volatile organic compounds of 4 percent each year (12 percent for every three-year period). A similar requirement is not mandated for carbon monoxide nonattainment areas because emissions reductions in the entire nonattainment area may not always be the best measure of progress for this pollutant (for instance, in areas that have a few intense "hotspot" problems) and the emissions inventories for carbon monoxide are less objective than for VOC's as most CO emissions are generated by mobile or area sources.

Therefore, States are allowed some flexibility in selecting quantitative targets to use as interim milestones for carbon monoxide nonattainment areas. Some areas may use emissions reductions measured in tons per year. Other areas may use reductions in the design value for the area or in the number of exceedances occurring each year. The legislation also allows the use of vehicle miles travelled or the number of vehicle trips initiated in the nonattainment area to be used as an objective milestone in areas where the overwhelming majority of the emissions are generated by mobile sources. Plans may also be based on milestones that reflect a composite of these indicators of reasonable further progress. When considering SIP revisions for approval under this section, the Administrator is to assure that the proposed milestone can be reliably measured, that it is a valid reflection of the underlying purpose (reasonable further progress toward attainment of the standard) and that it reflects all of the progress that is reasonably attainable during the three-year period. The Act requires that the standards be attained as expeditiously as practicable, and given some period of time for programs to be put in place, expeditious progress should include the largest possible reductions in the earliest years of the program.

As a further response to the problems which are evident in the SIP program, new section 188(g) of the Act requires that the comprehensive SIP revision required of each area include contingency or standby measures that can be implemented promptly, if an area fails to achieve a milestone or attain the plan by the deadline prescribed.

Under current law, plans are approved on the premise that they contain all of the measures which are necessary to attain and that the measures will meet the objective in precisely the way planned. This assumption is deeply flawed. Quite often, the plan is based on incomplete or inaccurate inventories. It may also fail to anticipate growth in emissions or the number of sources which will actually occur before the attainment deadline. Most measures that are proposed do not achieve the emissions reductions which are attributed to them in SIP's. And quite often States or regions fail to follow through on commitments that have been made (18 areas promised to implement Stage II while only a handful have—and two of those only in response to a district court injunction). It is far more reasonable to assume that many of the measures in the SIP will fail to achieve the reductions expected and that other uncertainties in the planning process will contribute to a shortfall in the air quality improvement which was projected for the latter stages of the plan.

In the past a failure to attain has required that the planning process be restarted entirely. Section 188, in contrast, proposes that every plan contain a measure or measures which are held ready in a standby capacity and which can be implemented should the area fail to attain the standard or meet an interim milestone. The contingency measures should be adopted as regulations by the State (so that the States does not have to put the regulation through the administrative process after the failure has been recognized) and should account for a potential 5 percent emission reduction in moderate areas and a potential 10 percent emission reduction in serious areas. The measure or measures should be implemented promptly upon a determination that a milestone or attainment deadline has been missed. Only those measures which are necessary to meet the targeted reductions need be implemented (if the target is less than the total percentage reduction that could be achieved by implementing all of the provisions). Contingency measures in a SIP for a moderate nonattainment area which fails to meet the deadline for attainment five years after the date of enactment shall be implemented promptly and not delayed by the one-year extensions which the Administrator may grant under section 190.

Continuing audits of implementation plans.—The new section 188 requires the Administrator to audit the implementation plan for each carbon monoxide nonattainment area every three years. The purpose of the audit is to determine whether the plan is being fully implemented and enforced and whether interim milestones are being achieved. To the extent practicable, the Administrator is to conduct these audits in the year after the State updates the inventory required by this section. That assures an audit based on the most recent information on emissions.

If the Administrator determines that provisions of approved implementation plans are not being implemented as required, the Administrator must impose the sanctions required by section 1900—that is, a ban on the construction of new major stationary sources of carbon monoxide emissions and a restriction in the use of highway funds. The Administrator may also withhold grants for the State's air program to the extent that the Administrator finds it necessary to commit Federal resources to establish air quality control measures for the area.

If the Administrator determines that the area has not met an interim milestone, the Administrator is to impose sanctions as described above for the failure to implement. In addition, the Administrator shall require the State in which the area is located to submit SIP revisions which will assure that the milestone is attained as expeditiously as practicable but not later than 18 months after the original milestone date. The Administrator may specify air quality control measures which are to be included in the SIP revision. In addition, the Administrator shall require immediate implementation of any contingency measures which have been submitted and approved pursuant to section 188(g)(4).

Vehicle inspection and maintenance programs.—States containing carbon monoxide nonattainment areas are to implement enhancements to their vehicle inspection and maintenance programs (or establish enhanced I/M programs where no program currently exists). This requirement only applies in areas with 100,000 persons or more. Moderate nonattainment areas with design values less than 9.9 ppm CO in the most recent calendar year before enactment may also be exempted from this requirement provided that the Governor of such area submits the attainment demonstration required by section 188(g)(2) of the Act.

Inspection and maintenance programs can be designed and conducted in a variety of ways. They may be annual or biennial. They may include all or only some of the vehicles on the road. They may be centralized or decentralized (operated out of neighborhood service stations or repair shops). Rather than specify every aspect of the enhanced I/M program that States are to adopt, the legislation sets a general performance standard, mandates some elements, and leaves many of the other decisions to State agencies.

The performance standard is stated as the tons of carbon monoxide emissions reductions which are achieved by the program compared to an area which has no inspection and maintenance program. The performance standard is 52,000 tons of emissions reductions for every one million vehicles inspected in the year in which the bill is enacted (most likely 1990). As the fleet of vehicles currently in use is replaced with new vehicles, the amount of emissions reductions which can be achieved with an I&M program (that does not change) will decrease, because the newer vehicles emit less carbon monoxide over their useful life than the vehicles which they are replacing. Therefore, an I/M program which achieved a 52,000 ton reduction in CO emissions from one million vehicles in 1990 will achieve less than the amount in 1991, even less in 1992, and so on.

The performance standard is established for the fleet that is in place in 1990 and will, thus, not become more stringent as the fleet turns over. The Administrator will implement the standard by publishing guidance indicating the effectiveness of various elements of an I/M program in terms of the reductions that would be achieved if that element were applied to the 1990 fleet. States will be obligated to adopt a package of program elements that assure achievement of the performance standard.

As with the enhanced inspection and maintenance programs for ozone nonattainment areas described above, each program approved under this section must have:

(1) comprehensive coverage of all light duty vehicles;
(2) visual inspection for tampering and misfueling;
(3) computerized emissions analysis;

(4) monitoring of onboard emissions diagnostic systems;

(5) if included, a waiver of not less than $200; and

(6) enforcement through denial of registration.

SIP revisions to implement enhanced inspection and maintenance programs must be submitted for each nonattainment area within one year after enactment and the program must be implemented as expeditiously as practicable.

Oxygenated fuels.—Each State containing a carbon monoxide nonattainment area shall include in the comprehensive SIP revision required by section 188(g) a program to implement and enforce the oxygenated fuels requirements imposed by section 211(e). That section requires that all fuels sold in nonattainment areas between October 1 and March 31 of each year contain at least 3.1 percent oxygen by weight.

The requirements of the oxygenated fuels program are fully discussed in the context of amendments to title II of the Act described below.

Although the requirement for oxygenated fuels is imposed by the Federal Government, States can play a significant role in carrying out this mandate through the State implementation plan. The SIP may include provisions to implement trading programs for oxygen credits and enforcement measures to assure that the 3.1 percent objective is fully attained.

Section 189.—The bill adds a new section 189 to part D of the Clean Air Act. This section mandates that States containing areas which are classified as serious nonattainment areas for carbon monoxide submit two SIP amendments as described below. These areas must implement each of the transportation control measures which are set forth in section 108(f) of the Clean Air Act. And each of the areas must have a program for major employers designed to increase vehicle occupancy during worktrips. These two requirements for serious areas are in addition to those described above which are applicable to all carbon monoxide nonattainment areas.

Transportation control measures.—Section 189 requires that the plan for each serious carbon monoxide nonattainment area include each of those transportation control measures for which guidance is issued by the Administrator under section 108(f). An area may forego implementation of one or more such measures, if it can demonstrate that it is implementing an alternative SIP provision (other than a provision specifically required by the Clean Air Act) which achieves an equal or greater reduction in emissions. A demonstration supporting substitution of the alternative provision must also show that the failure to implement the transportation control measure does not violate the requirement that plans demonstrate attainment of the standard as expeditiously as practicable. Revisions to the plan implementing the section 108(f) transportation control measures shall be submitted with the comprehensive plan revision required by section 188(g).

Employee ridesharing program.—The bill requires States containing serious carbon monoxide nonattainment areas to submit SIP revisions that implement an "employee ridesharing" program for major employers in each such area. The program will apply to each business concern which employs more than 100 persons in the nonattainment area (whether or not at a single location). Each of these employers will develop employee ridesharing programs to encourage higher vehicle occupancy during the worktrip. The performance objective for these programs is a vehicle occupancy rate 25 percent higher than otherwise occurs in the region. The SIP revision must require that each employer have developed a plan to meet this objective within two years of the date the revision is submitted. The objective is to be attained by each major employer by not later than four years after such date. Since the revisions are due two years after enactment of the bill, this gives major employers six years from enactment to reach the performance objective.

The objective applies only during the peak rush hours of the day. Employers who modify work schedules to shift trips to non-peak periods will not be required to include such trips in determining the average for their workforce.

Generally, the objective will be achieved by providing assistance and incentives for ridesharing and mass transit trips. Over the long-term, the requirement may modify transit routes or the location decisions of major employers wishing to meet the objective at a lower cost.

The Administrator may by guidance establish a variable intra-region base occupancy rate to reflect suburban, urban and central business district commuting patterns. In allowing for a variable base (for instance 1.3 persons per vehicle trip in suburban areas; 1.5 city areas; and 1.7 persons in trips to the central business district) the Administrator should not provide disincentives to employers who have located in areas where high vehicle occupancy modes are readily available. Such locational decisions should be rewarded in the guidance provided by the Administrator. The guidance should also establish methods for defining the peak rush hour periods during which the performance objective is to apply.

Employers who can demonstrate that: (1) they are spending as much per employee as it would cost to provide free parking; and (2) who nevertheless cannot meet the performance objective may receive a waiver from the 125 percent performance objective, provided that the waiver establishes an alternative objective which is enforceable. The purpose of this provision is to give economic definition to the level of effort that is expected of employers when implementing this requirement. Evidence presented to the Committee indicates that employers can realize substantial savings net savings by implementing ridesharing programs.

Cities in California which have experienced severe ozone pollution problems are implementing ridesharing requirements very much like the one required here. They project a 10 percent reduction in worktrips during rush hour periods and a 4 percent reduction in emissions (VOC's). In providing guidance to the States for SIP revisions that will fulfill these requirements, the Administrator shall assure comparable trip and emissions reduction in all serious carbon monoxide nonattainment areas.

Section 190.—The bill adds a new section 190 to part D of the Clean Air Act. Section 190 establishes mandatory and discretionary sanctions for areas which fail to implement requirements of the Act including failure to submit required SIP revisions, failure to implement provisions which have been approved and any failure to meet interim milestones. Section 190 also provides for the reclassification of areas which fail to meet the extended nonattainment deadlines.

Sanctions.—Section 190 imposes sanctions on nonattainment areas for any one of three reasons:

(1) failure to submit SIP revisions that can be approved by the Administrator;

(2) failure to implement SIP provisions that have been approved; and

(3) failure to achieve the interim milestones that are specified in the SIP.

In each case, two sanctions are mandatory. The Administrator must impose a ban on the construction of facilities which meet the definition of major stationary sources of carbon monoxide emissions applicable in the area; and (2) the Administrator must notify the Secretary of Transportation who will restrict highway funding available to the State to those projects which improve air quality (or which are necessary for reasons of public safety). The highway funding restrictions are further described in the context of amendments made to section 176(c) of the Act (the amendments are made by section 106 of the bill). In addition, and in the case of failure to submit plans and failure to implement plans only, the Administrator is given discretionary authority to withhold air pollution control funds which would otherwise be available to the State under section 105.

Reclassification and additional revisions.—Secton 190 provides that areas which have been classified as moderate nonattainment areas shall be reclassified as serious nonattainment areas, if they fail to attain the standard by the date five years after the date of enactment of the legislation. The reclassification can be stayed by the Administrator, if the Administrator determines that all requirements of the SIP and the Act applicable to the area have been implemented and that the design value for the area is not greater than 9.9 ppm CO (does not exceed the standard by more than 10 percent). The extension may be renewed for an additional year. Every area which is classified as a moderate nonattainment area pursuant to section 187 and which has failed to attain the standard by the date seven years after enactment of the bill shall be reclassified as a serious nonattainment area.

States containing areas which have been reclassified as serious nonattainment areas pursuant to this section shall submit SIP revisions not later than one year after reclassification which implement each of the requirements that apply to a serious area, including:

(1) demonstration of attainment as expeditiously as practicable but not later than ten years after enactment;

(2) attainment of interim milestones;

(3) implementation of transportation control measures; and

(4) implementation of the employee ridesharing program required by section 189(b).

In the event that a moderate area fails to attain the standard as required within five years and the implementation plan for the area contains contingency measures which have not been implemented, the Administrator shall require the prompt implementation of such measures pursuant to requirements in the Act which provide for attainment as expeditiously as practicable.

In the event that an area which is classified as a serious carbon monoxide nonattainment area (either at the time of enactment or subsequently as the result of reclassification) fails to attain the national primary ambient air quality standard for carbon monoxide by the date ten years after enactment, the area shall submit additional SIP revisions which demonstrate an annual reduction in carbon monoxide emissions for the area of not less than 5 percent for each year subsequent to the date for submission. The 5 percent reduction requirement is an interim milestone for purposes of section 190(c) and any failure to achieve such reduction is subject to an immediate sanction under those provisions. The SIP revisions for a serious area failing to attain are due 12 months after the otherwise applicable attainment deadline.

ADDITIONAL REQUIREMENTS FOR PM-10 NONATTAINMENT AREAS (SECTION 109)

SUMMARY

Section 109 amends part D of the Act by adding a new subpart 4, and new sections 191 through 194.

Attainment deadlines. (New section 191 of the Act).—The bill establishes an attainment deadline of not more than five years from the date an area is designated nonattainment for PM-10 but permits the Administrator to extend the deadline for not more than an additional five years if certain conditions are met. If the Administrator revises the particulate standard, the Administrator must promulgate requirements applicable to all areas that have not attained the revised standard, and the requirements must provide for controls no less stringent than those applicable to areas that are nonattainment for PM-10.

Requirements applicable to all PM-10 nonattainment areas. (New section 192 of the Act).—States with PM-10 nonattainment areas must submit inventories of emissions from PM-10 (or PM-10 precursor) sources within one year after enactment and every three years thereafter.

A major source is any stationary source that has the potential to emit 50 tons or more of PM-10 or PM-10 precursors. Each major source must pay a fee of $75 for each ton of PM-10 or PM-10 precursor emitted, and the fees are to be used by the State or local air pollution control agency to develop and implement nonattainment control programs required by the Act.

In order to operate, each major source must have an operating permit beginning 36 months after enactment. The permit must require the source to monitor emissions no less frequently than monthly. Offsets for emissions from new or modified major stationary sources must be at a ratio of 1.5 to 1.

Within 24 months of enactment each State containing a PM-10 nonattainment area must submit to the Administrator a State Implementation Plan (SIP) revision that demonstrates that the area will attain the PM-10 standard by the deadline required. The plan revision must also contain quantitative milestones that are to be achieved every three years and that assure that the area will reduce PM-10 and precursor emissions sufficiently during the years before the attainment deadline to assure that the deadline will be met. SIP revisions must contain contingency measures that will be implemented immediately if an area fails to meet the attainment deadline.

The Administrator must audit each implementation plan at least every three years to determine if provisions of the plan are being implemented and if milestones are being met, and if they are not, the Administrator must impose sanctions.

The Administrator may, on a case-by-case basis, waive a requirement otherwise applicable to an area that was granted an extension for attainment where non-anthropogenic sources of PM-10 are the principal cause of nonattainment in that area. The Administrator may not waive any control measures applicable to anthropogenic sources that were required as a condition for the extension. The Administrator may waive an attainment date where he determines that non-anthropogenic sources, together with extraordinary meterological conditions, contribute significantly to PM-10 standard violations.

Sanctions for failure to comply or attain a standard. (New section 193 of the Act).—If a State fails to submit required plans or revisions, fails to implement a plan, or fails to achieve required milestones, the Administrator is to prohibit construction or modification of major stationary sources, the Secretary of Transportation is to limit use of highway funds, and the Administrator may withhold State air pollution grants.

The Administrator may extend an attainment deadline for no more than two one-year extensions if certain conditions are met. An area that fails to meet the attainment deadline must submit a revised SIP that requires attainment in no more than five years and that provides for a five percent annual reduction in emissions of PM-10 or its precursors.

Guidelines for PM-10 sources. (New section 194 of the Act).—The bill requires the Administrator to issue control technique guidelines for reasonably available control technology and best available control technology applicable to major stationary sources and for measures to control emissions from area sources. The guidelines must identify controls for wood burning (including curtailment of residential wood burning as a reasonably available control measure), for prescribed burning for silviculture and agriculture, and for urban fugitive dust.

Not later than six months after SIP revisions required by new section 192 of the Act have been submitted, the Administrator must publish a list of all the categories of sources of PM-10 or precursor emissions that States indicated would prevent attainment of the standard within a five-year period. Within four years of the date of enactment, the Administrator must publish guidelines for control of emissions from each category.

PM-10 increments.—The bill authorizes the Administrator to substitute PM-10 increments for total suspended particulate standards in the prevention of significant deterioration provisions of the Act, so long as the substituted standards are at least as stringent as the increments for which they are substituted.

DISCUSSION

Nonattainment areas.—Fifty-eight areas that include 72 counties were identified as Group I areas by EPA in its PM-10 rulemaking published in August 1987. These areas, which are designated as nonattainment for PM-10 by section 101 of the bill, are listed in the following table:

PM-10 GROUP I AREAS

Region	State	Area of concern	County(s)
I	CT	I-95 Corridor	New Haven
	CT		Fairfield
	ME	Presque Isle	Arrostook
III	WV	Follansbee	Brooke
V	IL	Cook County	Cook
	IL	Madison County	Madison
	IN	Lake County	Lake
	MI	Wayne County	Wayne
	MN	Ramsey County	Ramsey
	OH	Cuyahoga County	Cuyahoga
	OH	Jefferson County	Jefferson
VI	TX	El Paso County	El Paso
VIII	CO	Aspen	Pitkin
	CO	Canon City	Fremont
	CO	Denver Metro	Adams
	CO		Arapahoe
	CO		Denver
	CO		Jefferson
	CO	Pagosa Springs	Archuleta
	CO	Telluride	San Miguel
	MT	Butte	Silver Bow
	MT	Kalispell	Flathead
	MT	Lame Deer	Rosebud
	MT	Libby	Lincoln
	MT	Missoula	Missoula
	MT	Polson/Ronan	Lake
	UT	Provo	Utah
	UT	Salt Lake Metro/Magna	Salt Lake
	WY	Sheridan	Sheridan
IX	AZ	Douglas	Cochise
	AZ	Hayden/Miami	Gila
	AZ		Pinal
	AZ	Maricopa	Maricopa
	AZ		Pinal
	AZ	Nogales	Santa Cruz
	AZ	Paul Spur	Cochise
	AZ	Rillito	Pima
	AZ	Yuma	Yuma
	CA	Coachella Valley	Riverside
	CA	Imperial Valley	Imperial
	CA	Mammoth Lakes	Mono
	CA	Owens Valley	Inyo

PM-10 GROUP I AREAS—Continued

Region	State	Area of concern	County(s)
	CA	San Joaquin Valley	Fresno
	CA		Kern
	CA		Kings
	CA		Tulare
	CA	Searles Valley	Inyo
	CA		Kern
	CA		San Bernardino
	CA	South Coast Basin	Los Angeles
	CA		Orange
	CA		Riverside
	CA		San Bernardino
	NV	Las Vegas	Clark
	NV	Truckee Meadows	Washoe
X	AK	Eagle River	Anchorage
	AK	Juneau	Juneau
	ID	Boise	Ada
	ID	Pinehurst	Shoshone
	ID	Pocatello	Bannock
	ID		Power
	OR	Grants Pass	Josephine
	OR	Klamath Falls	Klamath
	OR	Medford	Jackson
	OR	Springfield/Eugene	Lane
	OR	White City	Jackson
	WA	Kent	King
	WA	Lacey	Thurston
	WA	Seattle Metro	King
	WA	Spokane	Spokane
	WA	Tacoma Metro	Pierce
	WA	Wallula	Walla Walla
	WA	Yakima	Yakima

In addition to these areas, section 101 of the bill designates as nonattainment any area that contains a site for which monitoring data showed a violation of the PM-10 standard prior to the date of enactment. EPA estimates that approximately 10 areas will be added to the 58 listed above, but data upon which to make final determinations is not yet available.

Deadlines.—The bill requires that every PM-10 nonattainment area attain the standard within five years but provides for an extension of that deadline for areas that will have difficulty meeting it, despite rigorous efforts. An area can obtain an extension of up to five years if it can demonstrate that measures or technology to control the PM-10 emission sources in that area are not available or that PM-10 levels are due, at least in significant part, to secondary aerosols which are particles that are not emitted directly but form in the atmosphere from gases that were emitted directly, usually by point sources, and which are less susceptible to direct control. The area must commit to implementing all reasonably available control measures, including, but not limited to, technology and measures issued by the Administrator in guidelines as required by new section 195 of the Act.

An attainment date may be waived by the Administrator for an area that, because of nonanthropogenic sources and extraordinary meterological conditions, is unable to meet the attainment deadline. Such an area must have implemented every available control technology and measure for stationary and area sources that are anthropogenic to be eligible for consideration for such a waiver. The Administrator must then find that violations of the standard are not caused by human activity that can be modified or ameliorated, but rather by natural forces.

The term "anthropogenic source" includes sources that are indirectly created by human activity as well as those that are the direct result of such activity. An example of a source indirectly created by human activity are the dust storms that are generated from the dry lake beds at Owens and Mono Lakes in California. These dust storms, which have resulted in the highest PM–10 levels in the country, are a result of the diversion of water that would normally flow into the lakes. The diversion has exposed alkali lake beds which have been the source of severe dust storms that have created PM–10 concentrations that exceeded levels measured in forest fires. Measures to control PM–10 from sources such as these must be developed and implemented, and waivers of the requirements in subpart 4 of the Act, applicable to PM–10 nonattainment areas, are not available in these cases.

The Administrator may grant two one-year extensions of an attainment deadline if (1) the State has fully implemented all of the provisions in its SIP for an area, (2) the area does not exceed the PM–10 standard averaged over one year, and (3) the area has not exceeded the PM–10 standard averaged over a 24-hour period by more than 10 percent at any time in the two years preceding the attainment deadline. Extensions in these cases are justified because not only has the area made all possible efforts to meet the standard, but it is also very close to attainment and therefore not subjecting residents to extreme health risks.

Inventories.—The need for improved inventories for PM–10 is described above in the discussion of section 102 of the bill. The requirement that inventories must be updated every three years is important, not only inventories are designed to assess the ongoing effectiveness of new and existing control requirements, but also because the techniques for gathering data and preparing inventories for PM–10 will continue to improve over time, as will the quality of the inventories and their value in developing control strategies.

Implementation plan provisions.—Within 18 months of enactment States are to submit SIP revisions requiring major stationary sources to pay a fee, beginning not later than six months after the revision is submitted, of not less than $75 for each ton of PM–10 or PM–10 precursor emitted. Liability for the fee is in addition to any fee for hydrocarbons, oxides of nitrogen or carbon monoxide. A major stationary source is any stationary source that emits or has the potential to emit 50 or more tons of PM-10, or pollutants that are precursors of PM-10, per year. The revenue from the fees are to be allocated only to State and local air pollution control agencies with responsibility for implementing the nonattainment provisions of the Act. While precise estimates of the funds that would be raised by such a fee are not available, EPA projects that the amount would be less than $40 million.

Not later than 18 months after enactment States containing a PM-10 nonattainment area must submit a plan provision requiring each major source to have an operating permit. No source may operate without a permit issued pursuant to an approved program beginning 36 months after enactment. As part of the permit requirements, a source must monitor PM-10 or PM-10 purcursor emissions at least once a month and must report to the State periodically the results of monitoring. In the event that the monitoring detects a violation of a permit requirement, that information must be reported to the State within 24 hours of detection.

A comprehensive implementation plan that includes a demonstration that the area will achieve the PM-10 standard by the required deadline must be submitted to EPA by a State for each PM-10 nonattainment area in the State no later than 24 months after enactment. The Administrator is to approve or disapprove the plan within one year. If the Administrator cannot approve the plan because it does not demonstrate attainment, the Administrator may nevertheless require that elements of the plan that will improve air quality be implemented and enforced pending approval of a comprehensive plan that demonstrates attainment.

The bill includes measures to assure that progress toward attainment is made in the years before the attainment deadline. As has been noted above, one of the major problems with State implementation plans has been the lack of objective measures against which to determine progress prior to finding that an area will not be able to meet its attainment deadline. As in the provisions for ozone and carbon monoxide nonattainment areas, the bill requires that comprehensive implementation plans for PM-10 nonattainment areas include quantitative, three-year milestones against which air quality improvements can be measured. While emissions reductions are an obvious standard for a milestone, the bill permits the use of other measures so long as they can be quantified and clearly show, every three years, that air quality is improving so as to bring the area into attainment by the required deadline.

Another provision designed to check on an area's progress prior to the attainment deadline is the requirement that the Administrator conduct an audit of each area's implementation plan every three years. The timing of the audit, to the extent possible, should be the year after an updated inventory is submitted, which is also the year an area is scheduled to meet a milestone. The audit will determine whether the milestone has been met, the status of the area's inventory, and whether provisions in the plan, as submitted, are being implemented and enforced.

The bill requires that the comprehensive plan for each area include contingency measures that can be implemented promptly if an area fails to attain the standard by the deadline required. The contingency measures should be adopted as regulations by the

State, so that the State does not have to go through a rulemaking process after the deadline has been missed, and should provide for a reduction in emissions of PM-10 or PM-10 precursors of not less than 10 percent from the most recent inventory prepared prior to submission of the comprehensive plan. Contingency measures are to be promptly implemented and not delayed by any one-year extension of the deadline that may be granted.

Control measures and control technology.—Controlling emissions of PM-10 often entails reducing "area" emissions, that is, emissions that do not come from smokestacks or other point sources. Area sources that contribute to concentrations of PM-10 include dust from paved and unpaved roads, storage piles, construction activities, wood burning, road salting and sanding, and surface mining. Measures to control these emissions differ from, and are often more difficult to implement than, controls applicable to point sources.

The bill requires the Administrator, within 18 months of enactment, to issue control technique guidelines applicable to PM-10 and PM-10 precursor emissions from major stationary sources and also to issue guidelines for control measures for emissions from area sources. The bill specifies that the Administrator, at a minimum, must publish guidelines for control of emissions from residential wood burning, prescribed burning for silviculture and agriculture, and urban fugitive dust. The bill further requires the Administrator to issue control technique guidelines for every class or category of sources, the difficulty of control of which States indicated in their comprehensive plan submissions would prevent attainment of the PM-10 standard within five years. The bill gives the Administrator four years from the date of enactment to provide this needed guidance to the States.

The bill requires the Administrator, within 12 months of enactment, to publish guidelines that establish that curtailment of residential wood burning is a reasonably available control measure. Each PM-10 nonattainment area for which residential wood burning contributes 20 percent or more of PM-10 levels must, within 24 months of enactment, submit a plan revision that implements the curtailment guidelines. States may exempt wood heaters that are certified under EPA's Wood Heater Certification Program from the curtailment.

Reducing emissions from residential wood burning is necessary for many areas to achieve the PM-10 standard. One way to reduce these emissions is to prohibit the use of woodstoves or other wood burning devices on days when PM-10 ambient concentrations are high. Another way is to replace older, uncontrolled wood burning devices with stoves that are certified and significantly reduce PM-10 emissions. The bill allows States to provide exemptions from wood burning prohibitions for stoves that have been certified as being low-polluting. There may be occasions when prohibiting the use of uncertified devices is not enough; a State that chooses to provide exemptions for certified stoves must also be able to prohibit even their use if PM-10 pollution is at a level approaching the health standard. Providing exemptions from "no-burn days" for cleaner devices could be an inducement for people to replace dirtier models with cleaner burning ones.

Areas that seek an extension of the five-year deadline must impose the controls and measures contained in guidelines issued by the Administrator, but they must also make case-by-case determinations of reasonably available control measures and technology that will be required for sources for which the Administrator has not issued guidelines. The Administrator may waive certain requirements applicable to areas that seek an extension in the case of an area where nonanthropogenic sources are the principal cause of exceeding the PM–10 standard, but the reasonably available control measures and technology that are applicable to antropogenic sources may not be waived for such an area.

PSD increments.—The bill gives the Administrator authority to revise the basis for determining maximum allowable increases in the concentration of particulate matter in the prevention of significant deterioration (PSD) program. Currently, the Act specifies the allowable increases or "increments" in terms of total suspended particulates. When the Administrator revised the ambient air quality standard for particulate matter and adopted PM–10, rather than total suspended particulates, as the pollutant to be regulated, he had no authority to change the pollutant on which PSD increments are based. The authority given the Administrator is limited by the condition that any substituted maximum allowable increase, based on PM–10, must be at least as stringent in effect with respect to sources seeking PSD permits, as the total suspended particulate standard it replaces.

INTERSTATE POLLUTION (SECTION 110)

SUMMARY

The bill amends section 126 of the Act by adding a new subsection (d) which states that emission of an air pollutant which, by itself or in combination, reaction, or transformation, adversely affects public health or welfare in another State, is a violation of the section.

Section 126 is also amended by removing the reference to national ambient air quality standards in subsection (a) and by including groups of sources as actionable entities under subsection (b).

The bill amends section 302(h) of the Clean Air Act by inserting the phrases "precipitation," and "whether caused by transformation, conversion, or combination with other air pollutants."

DISCUSSION

The bill strikes "in excess of ambient standards" from section 126(a)(1)(B) of the Act. Under current law, interstate pollution must lead to a violation of the ambient standard to be actionable under section 126. It may not be possible to specify a source or group of sources that cause nonattainment. The amendment eliminates the need to establish a casual relationship between a polluter and violation of an ambient standard.

Current law allows section 126 to be used only for violations of section 110(a)(2)(E)(i), which relates to the preparation of SIP. Thus, a State being injured by another State's pollution can file a complaint about the offending State's SIP, but not the pollution itself.

The amendment to section 126(b) adding "or this section", is essentially procedural in nature and would allow a State to complain about the pollution itself, not just a defect in the offending State's SIP.

Under current law the definition of "welfare" protected by the Act may not include the quality of the precipitation, itself. It also may not include damage that results from conversion of a pollutant from one chemical to another—which happens with both acid rain and smog. The amendment to section 302(h) explicitly includes precipitation as a protected value and clarifies that transported, converted, and combined pollutants are all covered.

The Act currently allows a State to file a petition with the Administrator complaining of interstate air pollution, but not to file a lawsuit for violation of section 126. The amendment to section 304 would allow a State, and citizens, to sue in Federal district court for violation of section 126.

OUTER CONTINENTAL SHELF ACTIVITIES (SECTION 111)

SUMMARY

The bill adds a new section 327 to the Act that requires the Administrator, within 12 months of enactment, to promulgate requirements applicable to air pollution from Outer Continental Shelf (OCS) sources. The requirements must be the same as would be applicable if the sources were located in the corresponding onshore area; they take effect with respect to new sources on the date of promulgation and for existing sources twelve months later; and they are enforced as if they were a standard promulgated under section 111. States may be delegated the authority to implement and enforce the requirements if they submit proposed procedures to the Administrator and the Administrator finds the procedures adequate. The bill defines the terms "corresponding onshore area" and "OCS source."

DISCUSSION

The construction and operation of OCS facilities emit a significant amount of air pollution which adversely impacts coastal air quality in the United States. Operational emissions from an OCS platform and associated marine vessels can routinely exceed 500 tons of oxides of nitrogen (NO_x) and one hundred tons of reactive hydrocarbons annually. Platform construction emissions can easily exceed 350 tons of NO_x, while drilling a single exploratory OCS well can cause emissions in excess of one hundred tons of NO_x. A major uncontrolled offshore oil project can emit pollution in a year which exceeds pollutants emitted by one hundred thousand automobiles (meeting 1988 California emission standards), each traveling 10,000 miles. Yet under current Federal law, emissions from these major sources of air pollution are not required to be mitigated or controlled. Enormous discrepancies exist in the regulation of air pollution from virtually identical onshore and OCS sources. EPA requires stringent pollution controls onshore and within State waters to improve coastal air quality, while the Interior Department allows unmitigated OCS pollution under the provisions of the Outer Continental Shelf Lands Act.

Of primary concern is the fact that OCS air pollution is causing or contributing to the violation of Federal and State ambient air quality standards in coastal regions, with the potential that unmitigated OCS pollution will prevent certain coastal regions from attaining Federal clean air standards. OCS pollution in the Santa Barbara Channel and Santa Maria Basin for example, is expected to be equivalent to 37 percent of Santa Barbara County's onshore NO_x inventory and 22 percent of its onshore reactive hydrocarbon inventory in the year 2000. In Santa Barbara and other coastal regions, unmitigated OCS emissions can entirely negate the effect of all offshore emission reductions relied upon to achieve Federal clean air standards. The adoption of more stringent regulations onshore to compensate for the effect of these unmitigated OCS emissions could only be done, if at all, with great cost to onshore industries and with substantial disruption to life-styles of coastal residents. The magnitude of OCS pollution and the fact that the prevailing winds bring much of this pollution onshore has led the Environmental Protection Agency to express concern about the onshore air quality impacts from OCS develoment, along the coasts of both California and the Gulf States.

National energy production goals, both offshore and onshore, can only be achieved through the permitting and regulation of many low-polluting facilities. While keeping within allowable air quality levels, over ten times as much low-polluting oil production can be permitted, as compared to highly polluting oil production. Application of the same requirements to all offshore and onshore projects will preclude a few "dirty" projects from using up an air basin's remaining capacity to absorb pollutants and thereby impede future energy development.

This section of the bill is intended to ensure that air pollution from OCS activities does not degrade the air quality in coastal regions of the United States. This is to be achieved by applying the same air quality protection requirements as would apply if the OCS sources were located within the corresponding onshore area. These requirements are intended to include, but not be limited to, emission control requirements for new, modified, and existing facilities; offset requirements for new and modified facilities; and permitting, monitoring, reporting, enforcement, and fee requirements. The legislation will eliminate differences in air pollutant regulation which currently exist between OCS sources and sources located in the corresponding onshore area. OCS air pollution is to be regulated to protect both Federal and State established ambient air quality standards, consistent with the requirements for sources located onshore. It is the intent that OCS emissions be included in any State implementation plan for the corresponding onshore area required under this Act. Furthermore, all emissions from marine vessels (including engine emissions) which service or are associated with an OCS source, are subject to the same permitting, enforcement, monitoring, reporting, and offset requirements which would apply if these vessels were located in the corresponding onshore (State waters) area. This is intended to include emissions generated while vessels are traveling within the same air basin. These requirements should apply to vessel emissions occurring while at the OCS source, or when enroute to or from the OCS source and to or from the corresponding onshore area.

This legislation provides EPA, the Federal agency experienced and knowledgeable in air quality regulation, up to twelve months to establish regulations to implement section 327. These regulations should address administrative procedures, including fees, necessary for EPA to implement section 327 in areas where delegation to a State or local agency has not occurred. For all substantive air quality requirements, EPA should not write a unique set of requirements for the OCS but should adopt by reference the same requirements for emission controls, offsets, permitting, monitoring, reporting, and enforcement, as would apply if the OCS source was located in the corresponding onshore area. The regulations should also specify the procedures to be followed by the Administrator in determining under what circumstances the more stringent requirements of another onshore area should apply, rather than the requirements of the closest onshore area. Such procedures should consider those factors specified in subsection (b)(2), and should apply whether or not EPA has delegated authority to a State or local air regulatory agency.

This legislation transfers the responsibility for OCS air regulation from the Interior Department to the Environmental Protection Agency (EPA), in order to ensure consistent implementation of air quality laws and regulations for both onshore and offshore sources. It is also expected that EPA will delegate the authority to implement section 327 to the agency which has been delegated authority under the Act to regulate air pollution in the corresponding onshore area, whether that agency is a State or local air regulatory agency. EPA should delegate such authority expeditiously following receipt of a written petition requesting delegation from an onshore air regulatory agency. EPA should not withhold such delegation unless EPA finds that the onshore air regulatory agency's procedures are inadequate to meet the requirements of this Act.

This legislation is intended to supersede any inconsistent authorities, including, but not limited to, section 5(a)(8) of the Outer Continental Shlef Lands Act (OCSLA) (43 U.S.C. 1334(a)(8)). It is intended that the requirements of section 5(a)(8) will remain in effect until the requirements of section 327 apply. This legislation eliminates the requirements under section 5(a)(8) which have been interpreted by the Department of the Interior to require air pollution regulation only when the agency has proven that an individual OCS facility will cause a significant adverse impact on onshore air quality.

Indian Tribes (Section 112)

SUMMARY

The bill adds a new section 328 to the Act authorizing the Administrator to treat tribes as States under the Act. Within eithteen months of enactment the Administrator is to promulgate regulations specifying for which provisions of the Act it is appropriate to treat Indian tribes as States. Tribes may be treated as States only if the tribe is recognized by the Secretary of Interior and has a governing body carrying out substantial government duties; the functions under the Act to be carried out by the tribe are within the tribal government's jurisdiction; and the tribe is, in the Administrator's judgment, capable of carrying out the functions it is authorized to exercise. Tribes shall not be treated as states for the purposes of being assured of receiving at least one half of one percent of grants awarded under section 105 of the Act. For provisions of the Act where treatment of tribes as States is not feasible, the Administrator is authorized to include other means for administering those provisions.

DISCUSSION

The purpose of new section 238 of the Act is to improve the environmental quality of the air witin Indian country in a manner consistent with the EPA Indian Policy and "the overall Federal position in support of Tribal self-government and the government-to-government relations between Federal and Tribal Governments," as stated in the document *EPA Policy for the Administration of Environmental Programs on Indian Reservations,* Nov. 8, 1984.

Congress amended the Act in 1977 to authorize Indian tribes to redesignate their reservations for prevention of significant deterioration purposes, but did not address air quality planning or enforcement authority for Indian tribes in those amendments. The amendments in the bill are necessary to ensure that tribes will be allowed to participate fully in programs established by the Act as they take affirmative measures to manage, regulate, and protect air quality.

These amendments are intended to provide Indian tribes the same opportunity to assume primary planning, implementation and enforcement responsbilities for programs under the Act as they are presently accorded under the Safe Drinking Water Act and Clean Water Act. Subsection 328(a) authorizes the Administrator to treat Indian tribes as States and to provide grant and contract assistance to tribes to carry out functions provided by the Act. Thus, new section 328(a) of the Act constitutes an express delegation of power to Indian tribes to administer and enforce the Clean Air Act in Indian lands, as Indian tribes were delegated the power to administer and enforce the Safe Drinking Water Act and Clean Water Act. *See Brendale* v. *Confederated Yakima Indian Nation, U.S.,* 109 S.Ct. 2994, 3006–3007 (1989).

Subsection (b)(1) of section 328 requires the Administrator to promulgate final regulations within eighteen months of the enactment of the bill specifying the criteria that must be met for Indian tribes to be treated as States. Subsection (b)(1) establishes the following three criteria for treating Indian tribes as states:

(1) the Indian tribe must be federally-recognized and have a governing body carrying out substantial duties and powers;

(2) the functions to be exercised by the Indian tribe are to be carried out on the tribe's reservation or otherwise within the area of the tribal government's jurisdiction; and

(3) the Indian tribe must reasonably be expected, in the Administrator's judgment, to be capable of carrying out the func-

tions to be exercised in a manner consistent with the terms and purposes of the Act and all applicable regulations.

Subsection 328(b) (2) incorporates language from the tribal amendments to the Safe Drinking Water Act regarding provisions of the Act where the treatment of an Indian tribe as a State is inappropriate, administratively infeasible, or otherwise inconsistent with purposes of the Act. This subsection authorizes the Administrator to include in the regulations other means for the Agency to administer directly such provision to achieve the purposes of such provisions. This provision also confirms the Agency's obligation and responsibility to enforce the Act in Indian Country should a tribal government choose not to assume primary enforcement responsibility. Additionally, the subsection provides that an Indian tribe may not assume primary enforcement responsibility for a program under the Act in a manner less protective of public health than similar State programs. Because Indian tribes lack criminal jurisdiction over non-Indians, however, the provision states that Indian tribes are not required to exercise criminal jurisdiction to comply. Criminal sanctions against violators are to be sought by the Agency itself, consistent with the Federal government's general authority in Indian Country.

MISCELLANEOUS AND CONFORMING AMENDMENTS (SECTION 113)

SUMMARY

The bill amends section 106 of the Act to provide that regional ozone transport commissions are eligible for financial assistance under that section.

This section also directs the Administrator, in a free-standing provision of the bill, to analyze the accuracy of the Industrial Source Complex (ISC) Model as applied to surface coal mines and make any necessary revisions before using the model to determine the effects of mines on air quality for the purpose of new source review or of demonstrating compliance with national ambient air quality standards for particulate matter applicable to periods of 24 hours or less.

DISCUSSION

The amendment directs the Administrator to develop new or revised modelling techniques, including emission factors, for use in determining the prospective fugitive dust emissions from surface coal mines. The current model—the Industrial Source Complex (ISC) Model—is more suitable for multiple point sources such as smokestacks but does not lend itself to use in determining fugitive emissions from surface coal mines which include several sources moving within the perimeter of the mining area. As a result, studies and actual practice have indicated that the ISC model may overpredict fugitive dust emissions, especially for the short-term (24-hour) standard.

To counter this problem, some States have been requiring use of the ISC model to determine compliance with the annual standard for fugitive dust emissions from new or modified surface coal mines while permitting use of approved monitoring techniques to show compliance with the 24-hour standard.

The amendment directs the Administrator to develop a new or revised model within four years for use specificially with surface coal mines. In the interim period while the modeling revisions are being developed, the amendment permits the States to use "empirical based modelling approaches". It is understood that this would allow the States to continue to use monitoring results, subject to guidelines published by the Administrator with respect to the type of monitors and their placement, to determine compliance with the short-term ambient air quality standards for fugitive emissions from surface coal mines. It is also understood that the amendment and the interim use of monitoring would in no way alter or relax the requirements for controlling actual fugitive dust emissions from surface coal mines.

SECONDARY STANDARDS (SECTION 114)

SUMMARY

Section 114 directs the Administrator to request a report from the National Academy of Sciences on the role of national secondary ambient air quality standards in protecting public welfare and the environment. The report is to consider the adverse effects on the environment which may be caused by criteria pollutants, the secondary standards that would be required to fully protect environmental values, and means other than secondary standards which might accomplish the same purposes more effectively.

DISCUSSION

The Act authorizes the Administrator to set both primary and secondary ambient air quality standards for the six criteria pollutants. The primary standards are to protect public health with an adequate margin of safety. States are required to develop implementation plans to assure that primary standards will be attained and maintained in all air quality regions within the State. The Administrator conducts an ongoing program of research to assure that the primary standards are fully protective of public health with an adequate margin of safety to protect sensitive populations.

Secondary standards are authorized to protect welfare and the environment. Where an environmental harm would occur at ambient concentrations below the level which is protective of human health, more stringent secondary standards are to be promulgated. Secondary standards have not, however, played the role in air quality programs that might have been expected.

It is clear that for some criteria pollutants, especially ozone and particulate matter, significant environmental harm occurs at levels below the current primary standards. Ozone is damaging to crops, and possibly to forests, at concentrations as low as 0.04 parts per million (ppm), whereas the primary standard is 0.12 ppm. Ozone damage to agricultural crops is estimated to exceed $2 billion in the United States each year.

Particulate matter including PM-10 interferes with visibility in much of the eastern United States. The impact is now seen in national parks and monuments on a frequent basis. The PM-10 primary standard is by all accounts not sufficiently stringent to prevent noticeable degradation in visibility.

The Act authorizes the Administrator to set secondary ambient standards at levels which would protect these values. If a secondary standard is exceeded in an air quality region, the State is to prepare and implement a program to reduce emissions so that the standard might be attained. There is, however, no attainment deadline established by the Act for these secondary standards.

What is more, EPA has failed even to set secondary standards that would protect these values. For both ozone and PM-10, secondary standards—and thus protection of the environment—have been removed from the air quality program. Secondary standards have simply been established at the same level as the primary standard.

It may be that secondary ambient air quality standards are not the most appropriate mechanisms to achieve the goals of the Act. Much of the negative environmental impact of criteria pollutants results from transformation of the pollutants in the atmosphere (for instance, conversion of sulfur dioxide for which there is a standard to sulfates for which neither a primary or secondary standard exists). And much of the damage occurs in air quality regions distant from those where precursor emissions are generated.

Section 114 directs the Administrator to seek a review of these issues. The study is to be done by the National Academy of Sciences and is to consider and report on: (1) the existing scientific literature on negative welfare and environmental effects associated with ambient concentrations of the criteria pollutants (those listed pursuant to section 108); (2) the welfare and environmental costs which are incurred by the Nation as the result of current air pollution levels; (3) the role of secondary standards and State implementation plans in protecting these values; (4) the standards—as to pollutants, levels and form—that would be necessary to prevent welfare and environmental losses from air pollution; (5) the costs of meeting fully protective secondary standards; and (6) any means other than secondary ambient air quality standards which might be more effective in reaching the goals of the Act.

The report is to be completed three years after the date of enactment of this legislation.

TITLE II—MOBILE SOURCE CONTROLS

INTRODUCTION

Title II of the bill amends title II of the Act regarding motor vehicle emission and fuel standards.

Hydrocarbons and NO_x are both precursors of ozone which, at ambient levels still experienced in more than 100 urban areas of the United States and in rural areas cause adverse health and environmental effects. Health standards for carbon monoxide continue to be exceeded in 44 areas of the country; 150 million Americans live in areas that exceed the national ambient air quality levels for one or both of these pollutants.

Controls on emissions from mobile sources will be an important part of the efforts to attain healthy air in these areas for a simple reason: mobile vehicles are the largest source of ozone and carbon monoxide pollution.

Ozone forms when precursor emissions, volatile organic compounds (VOCs) and oxides of nitrogen (NO_x), released into the atmosphere, react photochemically. Mobile sources generate the largest single share of the national inventory of these precursor pollutants: 50 percent in the case of VOC emissions and 43 percent in the case of NO_x emissions, according to the Office of Technology Assessment. In the case of carbon monoxide, mobile sources are an even more significant source of pollution. They cause over 90 percent of CO pollution in most urban areas. Figure II-1 shows the predominant contribution of transportation sources to nationwide emissions of VOCs and NO_x.

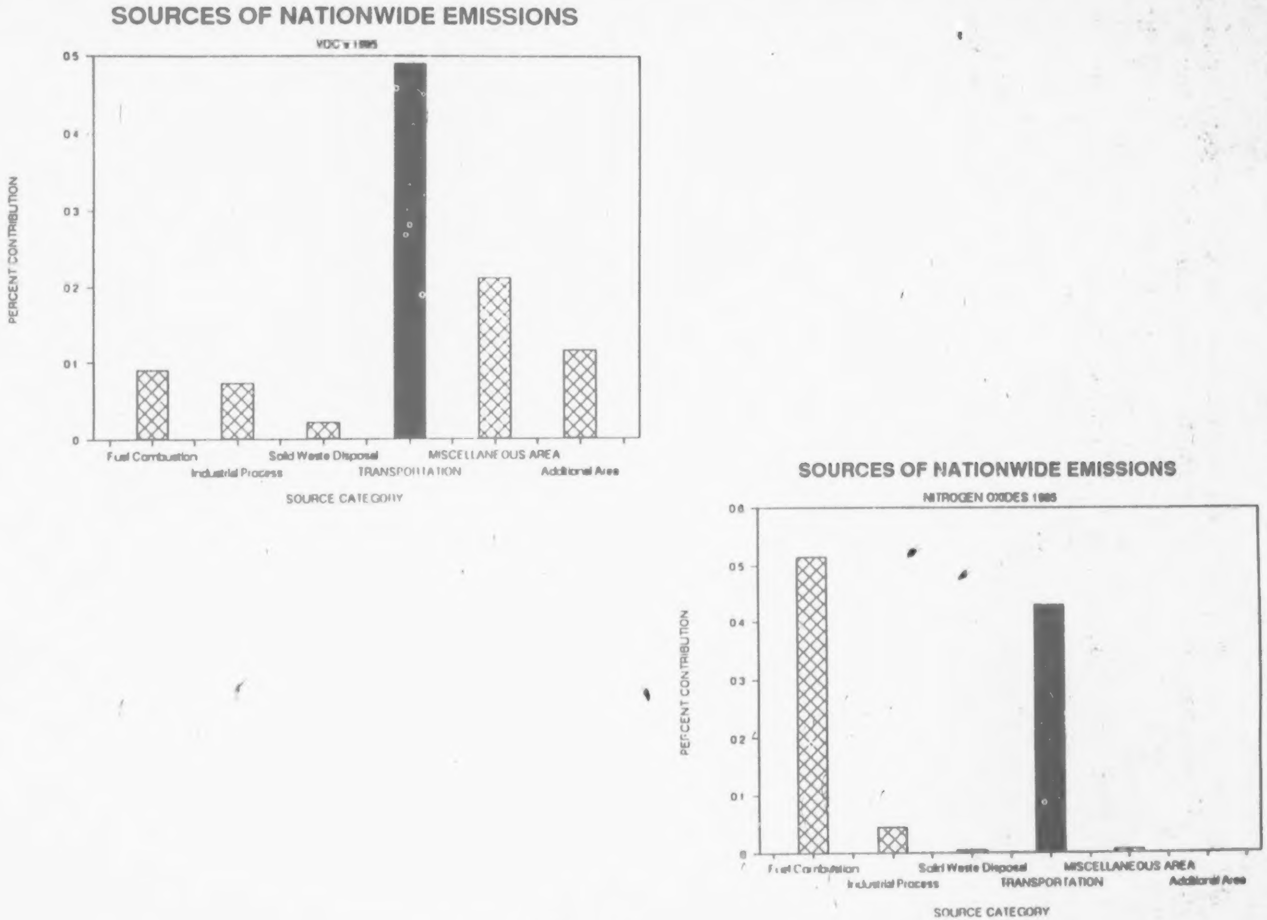
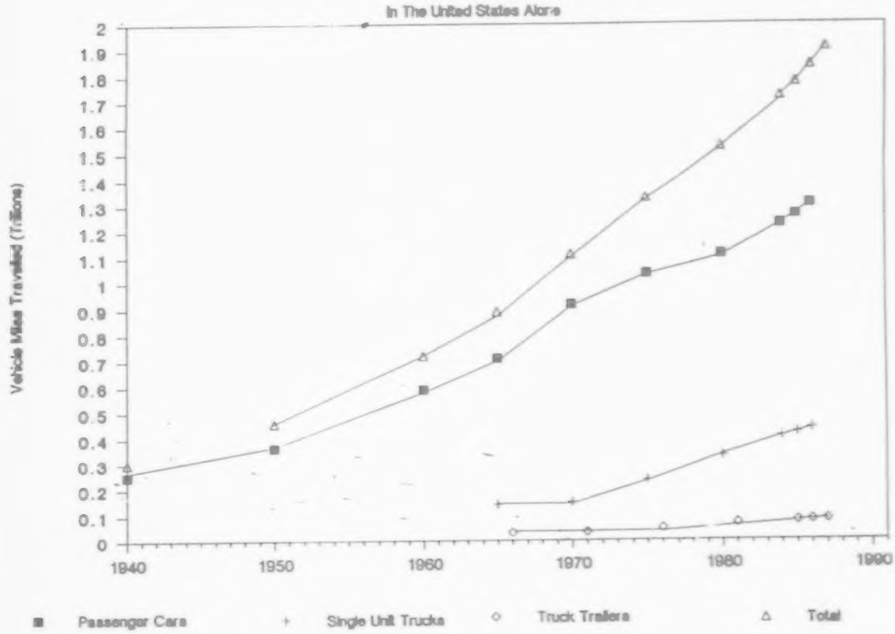

SOURCES OF NATIONWIDE EMISSIONS
VOC's 1985
PERCENT CONTRIBUTION
0.5
0.4
0.3
0.2
0.1
0
Fuel Combustion
Industrial Process
Solid Waste Disposal
TRANSPORTATION
MISCELLANEOUS AREA
Additional Area
SOURCE CATEGORY
SOURCES OF NATIONWIDE EMISSIONS
NITROGEN OXIDES 1985
PERCENT CONTRIBUTION
0.6
0.5
0.4
0.3
0.2
0.1
0
Fuel Combustion
Industrial Process
Solid Waste Disposal
TRANSPORTATION
MISCELLANEOUS AREA
Additional Area
SOURCE CATEGORY

Figure II-1

Additionally, while much progress has been made in reducing levels of lead in the ambient air, there is ample evidence that blood levels in individuals, especially children, are still a serious problem in this country. Further reductions in emissions of lead, through the phasing out of the reduction and sale of all leaded gasoline, will contribute to reducing incidences of lead poisoning.

Although there have been significant reductions of emissions of VOC's and CO from mobile sources since 1970, without further controls the emissions reductions benefits will be negated by the increase in both the number and use of motor vehicles. Total motor vehicle registrations (cars, trucks and buses) in the U.S. have increased 69 percent between 1970 and 1988. The number of vehicles miles traveled nationally is increasing by about 25 billion miles per year (Figure II-2). According to the Highway Users Federation, the growth rate in many urban areas is currently about 6 percent per year and overall mileage could double between now and the year 2000. Additionally, EPA data show that emissions of NO_x from mobile sources are currently 9 percent greater than they were in 1970.


Vehicle Miles Travelled Per Year

In The United States Alone

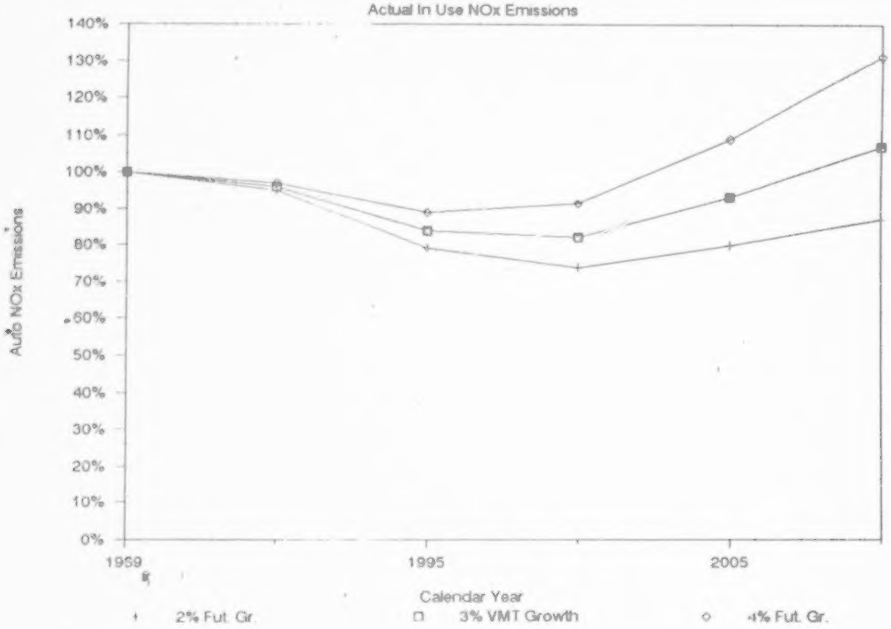
Source: Michael P. Walsh, Technical Consultant

Figure II-2

The increase in number and usage of motor vehicles will overtake emissions reductions that result from the phase-in of new, cleaner vehicles that meet the automotive standards adopted to date. Without additional controls on vehicles, overall emissions will start to increase over the next 10 to 15 years. Figures II-3, II-4 and II-5 show the projected increases in NO_x, CO and VOC emissions from a 2 percent, 3 percent and 4 percent increase in the number of vehicle miles traveled.

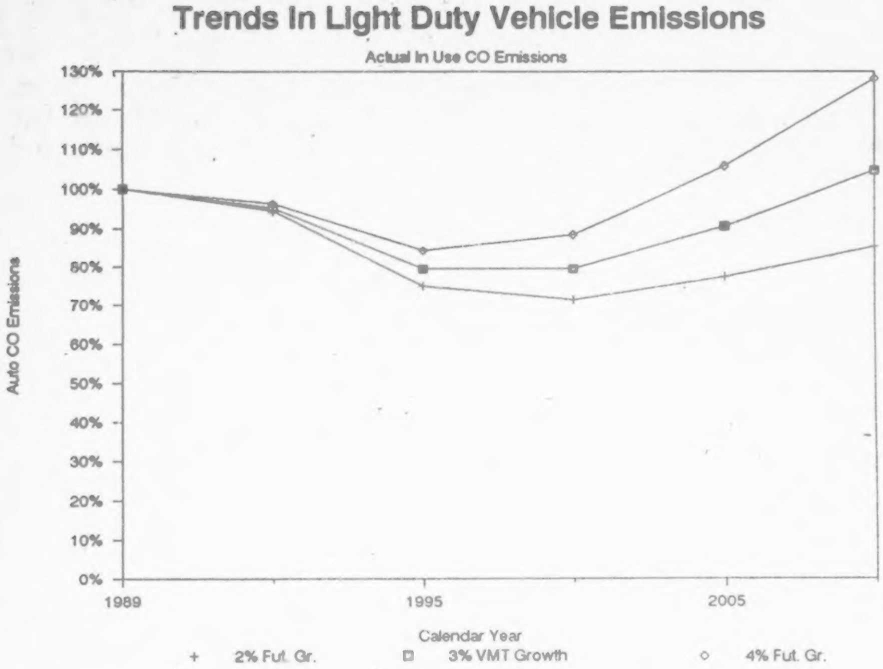
There is no single approach to achieve the needed emissions reductions from mobile sources. Rather, achieving significant reductions in VOC, NO_x and CO emissions will require a variety of measures, including tighter tailpipe standards, enhanced inspection and maintenance programs, controls on the volatility of fuels, controls on evaporative emissions and running losses, and measures to reduce vehicle use, among others. This title of the bill includes provisions to control emissions from vehicles through requirements that affect both vehicle technology and fuel quality.

Trends In Light Duty Vehicle Emissions



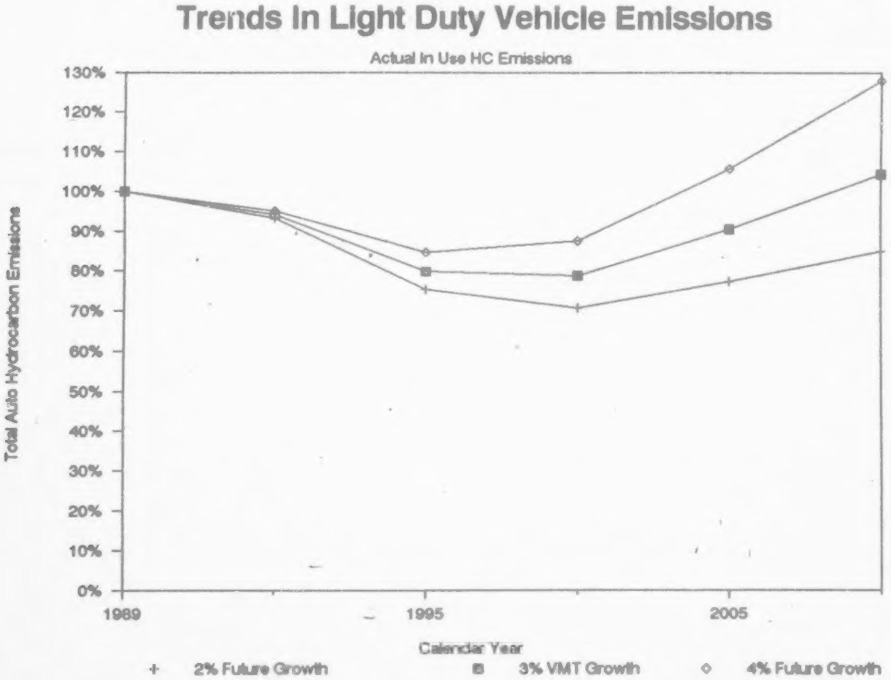
Source: Michael P. Walsh, Technical Consultant

Figure II-3



Source: Michael P. Walsh, Technical Consultant

Figure II-4



Source: Michael P. Walsh, Technical Consultant

Figure II-5

EMISSION STANDARDS FOR CERTAIN MOTOR VEHICLES (SECTION 201)

SUMMARY

This section of the bill adds a new subsection (g) to section 202 of the Act to establish emission standards that are summarized in the following tables. Standards are stated in grams per mile (gpm) and grams per brake horsepower-hour (gbh).

STANDARDS FOR GASOLINE-FUELED LIGHT DUTY VEHICLES

Pollutant	Proposed standards		Current law
	Model years	Standards	
NMHC	1993–2002	0.25 gpm	NA.
HC	1993–2002	0.31 gpm	0.41 gpm.
HC	2003 and after	0.125 gpm	0.41 gpm.
NO_x	1993–2002	0.4 gpm	1.0 gpm.
NO_x	2003 and after	0.2 gpm	1.0 gpm.
CO	2003 and after	1.7 gpm	3.4 gpm.

STANDARDS FOR DIESEL-FUELED LIGHT DUTY VEHICLES

Pollutant	Proposed standards		Current law
	Model years	Standards	
NMHC	1993–2002	0.25 gpm	NA.
HC	1993–2002	0.31 gpm	0.41 gpm.
HC	2003 and after	0.125 gpm	0.41 gpm.
NO_x	1991–2002	0.1 gpm	1.0 gpm.
NO_x	2003 and after	0.7 gpm	1.0 gpm.
CO	2003 and after	1.7 gpm	3.4 gpm.
PM	1993 and after	0.08 gpm	0.2 gpm.

TRUCK AND BUS STANDARDS

Vehicle or engine type and pollutant	Proposed standard (beginning in model year 1995 unless noted)	Current law
Trucks (3,750 lbs or more but less than 5,750 lbs, loaded vehicle weight):		
NMHC	0.32 gpm	NA.
HC	0.38 gpm	0.8 gpm.
NO_x	0.7 gpm	1.2 gpm.
CO	4.4 gpm	10.0 gpm.
Trucks 5,750 lbs loaded vehicle weight or more but less than 8,500 lbs GVW:		
NMHC	0.39 gpm	NA.
HC	0.46 gpm	0.8 gpm.
NO_x	1.1 gpm	1.2 gpm.
CO	5.0 gpm	10.0 gpm.
PM	0.12 gpm	0.26 gpm.
Heavy duty:		
NO_x	4.0 gbh (1996)	5.0 gbh (1991).
PM	0.25 gbh (1991–93)	Same.
PM	0.1 gbh (1994)	Same.
Heavy duty buses:		
PM	0.1 gbh (1991)	Same.

DISCUSSION

Emissions standards.—Current law requires control of emissions of hydrocarbons (HC), oxides of nitrogen (NO_x), carbon monoxide (CO), and particulates from motor vehicles. In addition, regulations promulgated under the Act have reduced the lead content of gasoline and thus, emissions of lead from vehicles. While significant progress has been made in reducing emissions of each of these pollutants (other than NO_x emissions which have increased 9 percent since 1970) from vehicles over the last decade, problems still remain. Mobile sources still account for 50 percent of the national inventory of VOCs, 43 percent of NO_x emissions, and over 90 percent of CO emissions in many urban areas.

In view of the contribution of vehicle emissions to persistent air pollution in this country, tighter vehicle controls are necessary to achieve and maintain health-based air quality standards. One effective means of controlling these emissions is through tailpipe standards.

Light duty vehicles.—The best data currently available on mobile source emissions show that exhaust or tailpipe emissions account for about one-third of total VOC emissions from passenger cars. The remaining VOC emissions are "evaporative emissions" and "running losses", which occur when gasoline evaporates from parked and operating cars, respectively. The design of light duty trucks results in lower evaporative emissions and running losses than from cars because the relatively large distance between the engine and the gas tank reducers gas tank heating and the resulting evaporative emissions. Exhaust emissions make up 46 percent of the VOC emissions from light duty trucks. NO_x and CO emissions are exclusively a by-product of combustion; thus, all NO_x and CO emissions from mobile sources are exhaust emissions.

The bill requires light duty vehicles to meet a first set of revised emissions standards beginning in model year 1993. These standards are 0.4 gram per mile (gpm) for NO_x, 0.25 gpm for non-methane hydrocarbons (NMHC), 0.31 for total hydrocarbons (HC), and 0.08 gpm for particulates. Current hydrocarbon emission standards under the Act are expressed in terms of total hydrocarbons. Methane constitutes between 15 and 25 percent of the hydrocarbons in the exhaust of typical gasoline-fueled passenger cars equipped with catalysts. Because it is a relatively inert gas, methane has a low photochemical reactivity, and does not contribute significantly to zone formation. However, methane is a "greenhouse gas" that contributes to global warming. Therefore, the bill includes a limit on the total HC tailpipe emissions to assure that emissions of methane do not increase above current levels as a result of the nonmethane standard recently adopted by California.

For the purposes of complying with emissions standards, the bill states that any vehicle with a loaded vehicle weight of 3,750 pounds or less is a light duty vehicle. Some vehicles currently defined by regulation as light duty vehicles exceed 3,750 pounds. These vehicles continue to be defined as light duty vehicles. The only change effected by this amendment is to redefine as light duty vehicles those vehicles that, because of characteristics other than weight, are currently considered to be light duty trucks. Vehicles in this category possess similar characteristics to automobiles and are most often used in the same manner as passenger autos. However, these vehicles are allowed to emit pollution at the higher levels of light duty trucks. The effect of this disparity together with the increasing share of total sales that vans and light trucks constitute, is that an increasing number of vehicles used as passenger vehicles have much higher emissions than automobiles. The provision in the bill assures that emissions from vehicles with similar equipment, characteristics and usage are controlled with an equal degree of stringency.

The first phase standards for light duty vehicles in the bill capitalize on advancements in emission control technology that has already been achieved. For example, controls to meet a standard of 0.4 gpm NO_x over a 50,000 mile lifetime is demonstrated technology. Forty percent of the new cars sold in California this year meet this standard. By 1991 the standard will be applicable to virtually all new vehicles sold in California, two years before the compliance date for the standard in the bill. In adopting the 0.4 gpm NO_x requirement, the California Air Resources Board (CARB) estimated the cost to be about $25 to $30 per car.

Earlier this year, California adopted a 0.25 gpm NMHC tailpipe standard for cars and the lightest category of trucks beginning with the 1993 model year. This is the same standard proposed in the bill to be applicable nationwide for the 1993 model year. In adopting the standard, CARB concluded that 0.25 gpm NMHC is feasible and cost effective. CARB's most recent staff analysis of the concluded that the requirements would probably entail expanded fuel injection, platinum tipped spark plugs, dual oxygen sensors, increased catalyst loading, and warmup or bypass catalysts on a portion of the fleet at an average cost of approximately $65 per vehicle. To put this number in perspective, it is useful to note that according to the April 24, 1989, issue of Automotive News, power windows on a two-door Chevrolet cost $220. The average price of a new car today is approximately $13,000.

The first phase standards in the bill leave unchanged the existing requirements for CO emissions. Light duty vehicles must meet a CO emissions standard of 3.4 gpm.

Finally, with respect to first phase requirements, certification data show that the vast majority of cars (over 80 percent) produced last year already were achieving 0.4 gpm NO_x, 0.25 gpm HC and 3.4 gpm CO on certification tests. Michael P. Walsh, an independent technical consultant on automotive issues, testified before the Committee on September 28, 1989,

> General Motors presented data at this year's [1989] annual meeting of the Society of Automotive Engineers showing that their average 1987 model year car is already meeting the standards required by the Committee Bill for HC and CO [in model year 1993], *in use, for 50,000 miles under normal maintenance.*

NO_x levels for these cars are already well below the 1.0 gpm current standard, moving toward the 0.4 gpm requirement of the bill.

While diesel-powered automobiles currently are only a small fraction of the vehicle fleet—less than one-half of one percent of new cars—history suggests that if energy prices rise, so will the proportion of diesels in the passenger vehicle fleet. Development of the technology to meet the standard of 0.08 gpm in the bill has made significant progress and establishing the standard in law will assure that improvements in durability and performance of the technology will be undertaken in advance of possible increases in the numbers of diesel vehicles on the road. California has already adopted a 0.08 gpm standard, which went into effect this year.

The bill also provides for a second phase of tailpipe standards. In the year 2003, emissions standards for HC, NO_x and CO for cars and the lightest trucks (less than 3,750 pounds loaded vehicle weight) would be reduced to half their 1993 levels. As illustrated in figures II-3, II-4, and II-5, as long as the vehicle population and miles traveled continue to grow, pollution will rise unless emissions per mile from vehicles are reduced. Without these additional controls, vehicle emissions will begin to increase.

These second phase standards will clearly force further developments in, and refinements of, emission control technology. But the level of innovation required will be modest in comparison with the quantum leap required by the 1970 Clean Air Amendments.

While California has not yet adopted standards equivalent to the second phase requirements in the bill, the California Air Resources Board is sufficiently confident of available technology to have committed in the California SIP to adopting a 0.2 gpm NO_x standard for the late 1990s. In anticipation of a tighter HC standard, CARB is evaluating a new technology, electrically-heated catalysts, that offers promise in helping to meet the 0.125 gpm HC standard. Additionally CARB has recently tested a family of eight Nissan cars in customer use, which at 40,000 miles emitted only 0.11 gpm HC.

The California Air Resources Board, based on its extensive experience in analyzing auto emissions control systems, has estimated the cost of the bill's second phase tailpipe standards as approximately $110 to $120 per vehicle. They concluded that these standards are feasible in the time provided by the bill and are cost effective when compared to the cost of applying additional controls on other sources of pollution.

Although the performance of a vehicle model on certification tests does not reflect the ability of a model to meet emissions standards throughout its useful life, it is worth noting that 30 of 85 models for model year 1988 were certified at the levels required in the bill to be met in 2003.

Light duty trucks.—The bill subdivides light duty trucks into two categories, those between 3,750 and 5,750 pounds, loaded vehicle weight, and those equal to or greater than 5,750 pounds loaded vehicle weight, but less than 8,500 pounds, gross vehicle weight.

Vehicles classified as light duty trucks are, in most characteristics, similar to cars. They are equipped with similar engines and drive trains and employ the same emission control systems as cars. According to the Motor Vehicle Manufacturers Association of America about two-thirds of all light trucks of 10,000 pounds gross vehicle weight or less are used primarily for personal transportation. About three-quarters of all compact pick-ups are principally used to drive to and from work.

The light duty truck standards in the bill are derived from standards applicable to light duty vehicles and are adjusted to take into account the heavier weights and carrying capacity of trucks.

Heavy duty trucks.—In section 201, table 2, the bill codifies, for heavy duty vehicles, certain standards that are already required by EPA regulations. These require that heavy duty vehicles meet a 0.25 gram per brake horsepower-hour (gbh) particulate standard in 1991 and a 0.10 gbh standard in 1994. The standards are codified in order to give the regulated industry both certainty and the incentive to achieve the standards by the dates required.

Emissions projections by EPA and others show that over the next several years, emissions of NO_x from heavy duty vehicles will increase (because of the increase in vehicles miles traveled) and will constitute a larger fraction of total NO_x emissions than at present in many areas of the country. In its proposed rulemaking of 1981, EPA proposed a 4.0 gbh NO_x standard for heavy trucks. Despite this, and the need for further NO_x reductions from larger trucks, EPA in 1985 adopted a less stringent standard of 5.0 gbh for 1991 and later models. The bill tightens the NO_x standard for existing regulations from 5.0 to 4.0 gbh, effective with model year 1996.

CARBON MONOXIDE EMISSIONS AT COLD TEMPERATURES (SECTION 202)

SUMMARY

The Administrator is required to promulgate regulations applicable to emissions of carbon monoxide from light duty vehicles and light duty trucks when operated at 20 degrees Fahrenheit. The standards require, for model years 1993 through 1999, that emissions not exceed 10 grams per mile for light duty vehicles and 13 grams per mile for light duty trucks when tested at 20 degrees Fahrenheit. Beginning in model year 2000, the standards require emissions that do not exceed 3.4 grams per mile for light duty vehicles and 4.4 grams for light duty trucks.

DISCUSSION

Recognizing that motor vehicles are the predominant source of carbon monoxide (CO) emissions, the Clean Air Act mandated that emissions from light-duty vehicles manufactured during or after model year 1981 be reduced by at least 90 percent from the CO levels of light-duty vehicles manufactured in model year 1970. The resultant 3.4 grams per mile (g/mi) CO standard enforced by EPA under the Federal motor vehicle control program, represents the primary CO control strategy available to communities. This standard is necessary to community efforts to achieve the ambient CO standard, established by EPA, which does not allow levels above nine parts per million (ppm) for any eight-hour concentration more than once per year.

Although the Act states that vehicles must meet the 90 percent emissions reductions criteria "when in actual use throughout their useful life", EPA has not formally interpreted this to mean that this reduction must be met at all temperatures at which vehicles operate. Thus, while vehicles achieve the 3.4 g/mi standard under the 68–86 degrees temperature range allowed under the standardized test conditions of the Federal test procedure (FTP), they emit substantially higher levels of CO at lower ambient temperatures. Stated another way, less progress has been achieved in the control of emissions during cold weather than used temperatures similar to those used during EPA's manufacturer compliance.

Exceedances of the national ambient air quaility standard for CO typically occur at temperatures well below those employed in the FTP because: the excess fuel needed to start a cold engine cannot be completely burned and results in higher levels of partially burned fuel (carbon monoxide) and unburned fuel (hydrocarbons); the conversion efficiency of a catalyst, the primary CO control technology, is very low during the first few minutes of a vehicle's operation; and periods of low winds and atmospheric inversions which lead to increased stagnation and elevated atmospheric CO concentrations often occur during low temperatures. Therefore, it can be stated that because vehicles account for up to 90 percent of the CO emitted in urban areas, the lack of cold temperature CO control is the primary reason that forty-four metropolitan areas exceeded the national ambient air quality standard for CO in 1987–1988.

Recent analysis by EPA suggests that the benefits of fleet turnover, enhanced inspection and maintenance programs, transportation control measures and oxygenated fuel programs will be insufficient to bring many of these areas into attainment of the ambient standard for CO. It also appears that the combined effects of continued growth in vehicle miles traveled and lower vehicle speeds from increased traffic congestion will substantially degrade the benefits of those control strategies.

Given EPA's failure to regulate motor vehicle CO levels at the temperatures at which exceedances of the CO standard occur, it is imperative that standards be legislated to ensure that progressive CO reductions occur at the temperatures where they are most needed. Two sets of 20 degrees Fahrenheit standards are required to ensure that progressive reductions occur. The first set is mandated for 1993 through 1999 model year vehicles and is designed to be met with existing vehicle technology. The second set of standards will stimulate the introduction of new control technologies for model year 2000 and later vehicles. In both cases EPA is to evaluate designs to assure comparable emission control at other temperatures. It should be noted, however that selected production vehicles have already demonstrated the ability to achieve the second set of standards.

CONTROL OF VEHICLE REFUELING EMISSIONS (SECTION 203)

SUMMARY

The Administrator is required to issue regulations requiring that motor vehicles be equipped with systems to control evaporative emissions during refueling ("onboard" systems). Light duty vehicles must be equipped with onboard systems beginning in the 1993 model year and other vehicles, at the earliest date determined feasible by the Administrator. The onboard systems must provide a minimum evaporative capture efficiency of 95 percent.

DISCUSSION

The bill requires all motor vehicles to be equipped with onboard devices capable of recapturing 95 percent of evaporative emissions during refueling. This provision takes effect in 1993 for light-duty vehicles, and at the earliest feasible date, as determined by the Administrator, for other vehicles.

Onboard vapor recovery systems seal the vehicle fillneck during refueling, preventing vapors displaced from the fuel tank from escaping into the atmosphere. Current onboard technology works by routing the vapors to the onboard canister, from which they are later desorbed by air flowing into the engine. Possible improvements in onboard technology have been identified by EPA, including a flexible fuel tank bladder.

Onboard systems of any kind provide an economic benefit to the motorist because vapors that would otherwise be lost to the atmosphere are retained for use in the vehicle. In fact, EPA projects that fuel savings will offset the cost of onboard systems so that reductions in VOC emissions will occur at virtually no cost. The Congressional Office of Technology Assessment (OTA) estimates that onboard controls would cost about $25 per vehicle. Onboard systems also reduce human exposure to toxic pollution. Evidence from epidemiological and animal studies has led the EPA to conclude that gasoline vapor, including benzene, is probable carcinogen.

The onboard system requirements apply to vehicles in all areas. OTA has estimated that by 2004, onboard systems would recover 530,000 tons of VOCs nationwide.

A number of authorities, including officials of the National Highway Traffic Safety Administration, have expressed concerns that larger charcoal canisters, larger vapor lines, and other components associated with onboard controls could increase the complexity of vehicle fuel systems and the chances of fuel system failures and fires in motor vehicle crashes. But EPA, based on its continuing analysis of onboard control safety, remains convinced that onboard controls can be simple in design and will not endanger passenger safety. In 1987, the EPA released a study of onboard system defects and tampering which concluded that reliable, inexpensive solutions existed for all of the potential problems identified. The EPA has also reported from its examination of fire and safety recall data that evaporative emission controls, which rely on equipment similar to that required for onboard systems, have not compromised vehicle safety.

EVAPORATIVE EMISSIONS (SECTION 204)

SUMMARY

The Administrator is required to promulgate regulations applicable to evaporative emissions of hydrocarbons from all gasoline-powered vehicles, including such emissions during vehicle operation. The regulations take effect with respect to model year 1994 vehicles and must require the greatest degree of emission reductions the Administrator expects to be achievable in any model year to which regulations apply.

DISCUSSION

Evaporative hydrocarbon emissions, or gasoline vapors released while a vehicle is operating or parked, are now the most significant source of vehicle hydrocarbon emissions during the summer, when ozone formation is at its peak. As exhaust hydrocarbon emissions have been reduced, the relative fraction of total emissions due to evaporation has increased. In addition, the understanding of evaporative emission formation has expanded in recent years, and the earlier estimates of the magnitude of evaporative emissions appear to have underestimated actual in-use emissions. Evaporatiive emissions are also much larger than refueling emissions, which are related but are usually considered separately.

Evaporative emissions while the vehicle is parked can be separated into two components. Hot-soak emissions are generated in the fuel system and tank due to residual engine heating after operation. Diurnal emissions are tank vapors generated by the daily heating of the vehicle by the ambient environment.

Evaporative emissions while the vehicle is operating are called running losses. Running losses are vapors generated in the fuel tank as it is heated during operation. This heating occurs in different vehicles for a variety of reasons as a function of the interaction of such factors as engine and exhaust heat, recirculation of fuel from the fuel injection system, pavement heat and air flow around the tank.

EPA estimates that evaporative emissions and running losses may be as much as 30 percent of all urban VOC emissions from all sources.

Evaporative emission control systems have since their introduction in the early 1970s focused on diurnal and hot-soak emissions. These systems are relatively simple and inexpensive, consisting of a charcoal canister for collecting vapors, a purging system to mechanically or electronically meter the collected vapor to the engine when the vehicle is operated, and associated hoses. By their nature, if evaporative systems reach the limit of their vapor collection or purging capacity, further vapors are released as uncontrolled emissions.

The test procedure currently used by EPA exercises the evaporative system in a way that roughly simulates a single day of nonoperation as well as the hot-soak experience. An assumption that the fuel has a volatility of nine pounds per square inch (Reid Vapor Pressure or RVP) is also built into the procedure. An assessment of running losses is not a part of the current evaporative emissions test.

EPA, the automobile manufacturing industry, and the oil refining industry all now generally agree that the current test procedure is inadequate and that current evaporative systems often fall short of complete control. One significant reason for this shortfall has been the increase in the volatility of in-use summertime gasoline to levels significantly higher (11.0–11.5 RVP) than the 9.0 RVP fuel used in the test. EPA has begun to address this mismatch of vehicle technology with in-use gasoline by rulemaking action to reduce in-use gasoline volatility levels. EPA has also begun to implement a two-phase program which will ultimately achieve volatility levels of 9.0 RVP or lower nationwide. The bill, in section 214, includes provisions to assure that that goal is achieved.

Even when in-use gasoline volatility is matched with the design of vehicle evaporative control systems, evaporative emissions and running losses remain a significant problem, due to additional shortcomings in the current test procedure. The primary aspects of the current procedure that lead to inadequate control systems relate to the number of days of non-operation simulated, the temperatures simulated, and ignoring running losses. An improved evaporative test procedure is necessary to induce an increase in the capacity of vehicle control systems under these conditions.

About 16 percent of vehicles on any day have experienced more than one diurnal heating cycle without engine operation. Under high temperature conditions common on days of high ozone formation, most such vehicles generate sufficient vapor to overload the canister and release vapors to the atmosphere. A test procedure that incorporates at least two diurnal heating cycles at temperatures representative of high-ozone days would ensure that vehicles could control diurnal emissions under most conditions.

In order for the test procedure to provide assurance that running losses are not being routinely emitted on high-ozone days, additional changes would be required. EPA is considering both actual tests for running losses and making a number of changes to the existing test procedure to approximate performance under actual running loss conditions. It is imperative that the test selected adequately measure and thus bring about maximum achievable control of these emissions. After promulgating regulations effective beginning in the model year 1994, EPA may regulate evaporative emissions further if more stringent controls are feasible.

For a vehicle to pass an evaporative test procedure incorporating changes such as those outlined above would require improvements primarily in two aspects of evaporative control systems: canister and fuel tank. There would be some ability to trade off greater purge capacity for greater canister capacity. In addition, if a manufacturer is successful in limiting the temperature of the fuel in the tank during operation or non-operation, the need to increase both purge and canister capacity may be limited. Finally, for safety reasons, any test procedure should encourage, to the extent possible, control systems that do not rely on pressurizing of the fuel tank in controlling vapors.

Some increase in canister capacity and purge system capacity can be expected to handle more vapor under many varying conditions, without harm to exhaust emissions or vehicle performance. Overall, EPA currently estimates an increase of about $10 in the price of vehicles equipped to pass an improved evaporative and running loss test procedure.

Onboard Emission Diagnostic Systems (Section 205)

SUMMARY

The bill requires the Administrator to promulgate regulations under new section 202(j) of the Act requiring manufacturers of light duty vehicles and light duty trucks to install emission diagnostic systems beginning in model year 1994. The Administrator is authorized to issue regulations requiring States to revise their vehicle inspection and maintenance programs to require inspection of these systems and maintenance and repair of emission-related malfunctions and deterioration of the diagnostic system, itself.

DISCUSSION

Since 1981, manufacturers of motor vehicles have started to install on many vehicle models an onboard computer and memory system which is used to monitor and control engine systems. The computer is also used for onboard diagnostic of performance related components. This onboard system can be expanded to include the diagnostic of in-use emission related component malfunctions. The onboard emission control diagnostics (ECD) system would include a warning system, such as a dashboard light, to alert the driver to malfunctions and would store fault codes that can be used by mechanics to aid in diagnosing and repairing malfunctions. The ECD system can also be used as part of State inspection and maintenance programs to identify malfunctions and assure proper repair.

The State of California has adopted regulations requiring such diagnostic systems and warning lights on vehicles beginning with the 1988 model year. California recently adopted significant amendments to these rules which will go into effect beginning in the 1994 model year. Manufacturers are not voluntarily choosing to install such systems on the vehicles sold in the remaining states. Thus, Federal regulations are necessary to assure that the substantial benefits of ECD are achieved nationwide. EPA participated closely with California in the development of the California regulations. The Federal regulations should adopt to the extent appropriate the same technical requirements, minimizing development costs and facilitating use of the same hardware and other system attributes nationwide.

Specifically, Federal regulations should require the monitoring and diagnosis of the catalyst, oxygen sensor, exhaust gas recirculation system, evaporative emission control system, auxiliary air system, and the fuel metering and ignition systems. Additionally, as California has adopted, the Federal regulations should require monitoring for potential coolant leaks from those vehicle air conditioning systems which utilize CFC coolant or other coolant also identified as providing a significant risk of damage to the stratospheric ozone layer. ECD systems also have the potential to enhance the effectiveness of State inspection and maintenance programs. The standardized ECD system malfunction codes can be read during an inspection to identify emission component malfunctions. The bill authorizes the Administrator to adopt regulations requiring the States to amend their State implementation plans to provide for inspection of ECD systems and the maintenance or repair of any emission related system identified by the ECD system including maintenance and repair of the ECD system itself.

To facilitate the ability of repair facilities, including independent repair facilities, to properly diagnose emission component malfunctions, it is necessary to provide standardization of connectors to ECD systems, fault code identification, and computer access protocols. Federal regulations are necessary to assure that all vehicle manufacturers use ECD systems that can be readily accessed and interpreted with a single, standardized off-vehicle device. While manufacturers have incentive to standardize protocols for driveability and fuel economy system failures, EPA will have to promulgate ECD regulations to provide standardization of the various emission control diagnostic systems, computer access protocol, and related maintenance information.

The amended section 202 of the Act authorizes the Administrator to promulgate regulations for ECD. Existing section 207(c) of the Act provides for recall of vehicles which do not conform to the regulations adopted under section 202, thus providing clear authority for the Administrator to recall classes or categories of vehicles determined to have malfunctioning ECD systems during their full useful life. This authority will enable EPA to ensure that the emission components and the ECD system operate properly. A vehicle will be recalled or repaired if, during the useful life of the vehicle, the ECD system itself is broken or malfunctions such that it would no longer be able to serve its intended function of alerting the vehicle operator to the need for emission related maintenance and properly storing such information for subsequent retrieval by inspection or maintenance personnel. The ECD system is intended to alert the operator to the need for maintenance which may head off further emission deterioration or damage to the emission control system. Therefore, the Administrator may order a recall and a repair of the ECD system in cases where there is a systematic misdiagnosis, even if the vehicle is passing emission standards, either by not alerting the operator to the need for necessary repair or by flagging a repair which is not necessary.

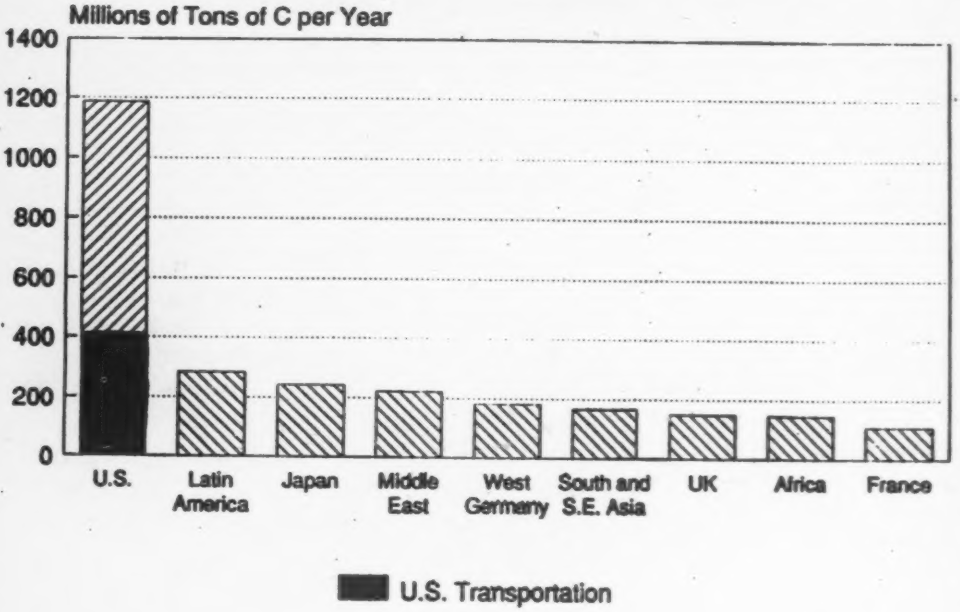
Emissions of Carbon Dioxide From Passenger Cars (Section 206)

SUMMARY

The bill adds a new section 216 to the Act that requires the Administrator to set emissions standards for carbon dioxide from light duty vehicles at no more than 266 grams per mile for model years 1996 to 1999, and at not to exceed 220 grams per mile beginning in model year 2000. The test used to determine compliance with the emission standard is to be the test used to determine compliance with corporate average fuel economy requirements in model year 1988 or procedures that yield comparable results. A manufacturer that does not meet the emissions standard for the fleet must pay $6 for each gram per mile the fleet average exceeds the standard, multiplied by the number of vehicles to which the standard applied. The Administrator is authorized to promulgate regulations that allow a manufacturer to use credits from a year that the manufacturer's fleet achieved lower emissions than required by the standard for up to two model years before or after the year in which the fleet performance was better than required by the standard.

DISCUSSION

Motor vehicles produce one quarter of the carbon dioxide (CO_2) emitted in the United States and passenger cars, alone, contribute 14 percent of that amount. The United States is responsible for over 20 percent of global CO_2 emissions. Figure II-6 shows graphically that CO_2 emissions from motor vehicles in the United States are a significant portion of CO_2 worldwide.



CO2 EMISSIONS FROM FOSSIL FUELS FOR SELECTED REGIONS (1985)

Source: World Resources Institute, DOE

Figure II-6

Reducing CO_2 from light duty vehicles in the United States will not solve the global warming problem. No single measure will. But the necessity for taking steps now is becoming more apparent as more scientific information becomes available. (There is an extensive discussion of global warming and the "greenhouse effect" in this report accompanying title VII of the bill.) The primary result of adopting the CO_2 standards in the bill will not be to reduce CO_2 emissions significantly below existing levels but to keep them from *increasing*.

Analysis conducted for the World Resources Institute conclude that if the average fuel efficiency of new cars sold between 1995 and 2000 were 40 miles per gallon (as determined by the current EPA tests) and 45 miles per gallon between 2001 and 2010—substantially higher averages than required by the bill—and vehicle miles traveled continue to grow at an annual rate of 2.7 percent (the average annual VMT growth from 1980–86), by the year 2010 gasoline use, and the resulting CO_2 emissions, would be 3 percent *higher* than in 1986. Thus, the standards in the bill, which equate to approximately a 33 miles per gallon fleet average for model years 1996 to 1999, and 40 miles per gallon beginning in model year 2000, are unlikely even to hold CO_2 emissions from cars at approximately current levels over the next two decades. Analysis provided the Committee by the World Resources Institute shows that if VMT grows at the 1980-86 rate and there is no improvement in new car fuel efficiency, CO_2 emissions from cars will increase 35 percent between 1986 and 2005.

The standards required by the bill do not assume a need for breakthroughs in fuel efficiency technology nor dramatic downsizing of the vehicle fleet. In a November 1989 response to questions from the Chairman of the Consumer Subcommittee of the Senate Committee on Commerce, Science and Transportation, the Department of Energy made the following statements:

> For 1995 we estimate that domestic vehicle manufacturers could achieve 32 to 33 mpg for new passengers care *if* they modified product plans to make maximum use of available technology and return to 1987 levels of vehicle size, performance, and luxury . . .
>
> For the year 2001, substantially greater opportunity exists to improve fuel economy through technology and revised product plans. Under a assumption of maximum use of technology and a return to 1987 levels of performance and size we estimate that a new car CAFE level of 39 mpg is the maximum achievable level.

While DOE does not endorse the concept of returning to 1987 size and performance levels, their analysis does show that the standards in the bill can be met by domestic manufacturers using existing technology and a product mix that was available in 1987.

The bill requires the Administrator to use the test procedures that were used to determine corporate average fuel economy in model year 1988—or procedures that yield comparable results—to determine compliance with the CO_2 standard. This means that the Administrator is to compute the weighted average carbon dioxide emissions using the urban and highway driving cycles used in the 1988 tests to determine compliance with CAFE standards, weighted 55 and 45 percent, respectively.

The Administrator must assess penalties against a manufacturer who is determined not to have complied with the fleet average CO_2 emissions requirements. The amount of the penalty is $6, multiplied by the number of grams per mile the manufacturer's fleet emission average exceeds the standard, multiplied by the number of vehicles to which the standard applied. The Administrator is authorized to promulgate regulations to allow a manufacturer to use credits for fleet average emissions in one model year that were below the standard to reduce or eliminate penalties to which the manufacturer would have been subject in any of the two model years before or after the year in which emissions were below the standard.

LOW-POLLUTING VEHICLES (SECTION 207)

SUMMARY

The bill defines the term "low-polluting fuel" and requires the Administrator, within 18 months of enactment, to set emissions standards for vehicles that use a low-polluting fuel. Standards must be set for emissions of carbon monoxide (CO), formaldehyde, hydrocarbons (HC), oxides of nitrogen (NO_x), carbon dioxide (CO_2), and other pollutants the Administrator identifies as a potential threat to public health or welfare. The standards, at a minimum, must not permit emissions of each listed pollutant to exceed standards for that pollutant from a gasoline-fueled vehicle, and must require that emissions from low-polluting vehicles contribute less to ozone formation than gasoline-powered vehicles.

DISCUSSION

The purpose of this section is to address a possible impediment to the use of any one of several fuels that may be less polluting than gasoline. Vehicle manufacturers cannot sell vehicles that have not been certified and would have little incentive to develop alternatives to gasoline-powered vehicles if they are not confident that the alternatives can be certified and sold.

The Administrator has already promulgated emissions standards applicable to vehicles that use methanol as a fuel. To assure that the absence of emissions standards applicable to vehicles using fuels other than gasoline or methanol does not inhibit potential development of such vehicle/fuel combination, the bill requires the Administrator to publish regulations applicable to vehicles powered by the other listed fuels or comparably low-polluting fuels.

The key condition the Administrator must meet in setting standards for low-polluting fuels and vehicles is that the standard (or standards) for each listed pollutant—CO, formaldehyde, NO_x, HC, and CO_2—and any other the Administrator identifies, must be at least as stringent as the standard for gasoline-powered vehicles, and emissions from a low-polluting vehicle must contribute less to ozone formation than emissions from a gasoline-powered vehicle. With respect to formaldehyde or other pollutants for which no standard exists for gasoline vehicles, the Administrator must assure that the standards applicable to low-polluting vehicles allow no greater emissions than are actually emitted from gasoline vehicles.

The Administrator could issue a single set of standards applicable to all low-polluting fuels or may establish different standards for different fuels. If a low-polluting fuel can meet the condition established by the bill relative to gasoline but cannot achieve a standard or standards as low as another low-polluting fuel, different standards for the different fuels should be set. This is to assure the maximum emissions reductions and air quality benefits will be achieved by setting the most stringent standards for each fuel, but that development of one promising low-polluting fuel is not abandoned because it is not as low-polluting in one or another characteristic as another fuel.

LIGHT DUTY VEHICLE USEFUL LIFE (SECTION 208)

-SUMMARY

Beginning with model year 1995, the useful life for light duty vehicles is extended from 5 years and 50,000 miles to 10 years and 100,000 miles.

DISCUSSION

As the most direct means of improving in-use performance of automobiles, the bill increases from 50,000 miles or 5 year to 100,000 miles or 10 years the definition of the term "useful life" for light duty vehicles in the Act. The concept of useful life, after changes in the Act made by section 209 of the bill dealing with warranties, is used in two elements of the Federal motor vehicle pollution control program: in setting the durability standards for certifying a vehicle model and in establishing the period during which vehicle families are subject to recall for failure to conform to emission standards.

By changing the statutory definition from what is actually only about one-half the useful life of most cars to a period that covers the expected use of the vehicle, the bill enhances the likelihood that emission control systems will be designed and produced to work effectively throughout the time the vehicle is being used. Light and heavy duty trucks are already required to meet emission standards during this full useful life.

New, more stringent tailpipe standards required by section 201 of the bill take effect in model year 1993. For two years, the tighter standards apply only for 50,000 miles or 5 years. Beginning with the 1995 model year, cars must be manufactured to meet the applicable tailpipe standards for the expected full useful life of the vehicle. Manufacturers are, thus, given two additional years either to improve the durability of the emission control system or to certify vehicles at a lower zero-mile emission level, or do a combination of both, in order to meet the longer useful life requirement.

WARRANTIES (SECTION 209)

SUMMARY

Section 209 of the bill amends section 207 of the Act by amending the length of time the manufacturer must warrant that emissions control components or devices are free from defects. This section reduces the warranty period for emissions control devices or components from 5 years or 50,000 miles to 2 years or 24,000 miles beginning in model year 1995 vehicles. Specified items must be warranted for a period of 8 years or 80,000 miles. Items covered under the longer warranty period include catalytic converters and electronic emissions control units and additional pollution control devices or components specified by the Administrator if the device or component (except in the case of onboard emissions diagnostic systems) was not in general use on vehicles and engines manufactured prior to model year 1990 and the Administrator determines the cost of such device or component exceeds $200.

DISCUSSION

The bill establishes a warranty period and distinguishes it from the useful life of the vehicle as defined in section 202 of the Act.

The bill also amends section 207 of the Act by adding a new subsection (i). This subsection reduces the length of time the manufacturer must warrant all but two emissions control devices and components that are currently in use from the current 5 years or 50,000 miles to 2 years or 24,000 miles. The current warranty is extended to 8 years or 80,000 miles for the catalytic converter and the electronic emissions control unit. These warranty provisions go into effect beginning with model year 1995 vehicles.

In addition, the provisions grants authority to the Administrator to include additional emissions control devices or components under the 8 years or 80,000 mile warranty period if two conditions are met. First, the component or device must not have been in general use on an engine or vehicle manufactured before model year 1990. Second, the component or device must cost more than $200 (in 1989 dollars). An exception to the first condition is made for onboard emissions control diagnostic systems. Thus, the Administrator has authority to include these systems under the longer period if the cost of the systems exceeds $200.

Section 207(c)(3) of the Act requires that the manufacturer specify proper maintenance for the vehicle and all its components and that the manufacturer clearly indicate on written maintenance instructions that maintenance, replacement or repair of the emission control devices and systems may be performed by any automotive repair establishment or individual using any automotive part which has been certified pursuant to section 207(a)(2) of the Act. The bill directs the Administrator to determine that these requirements have been met before the condition in subparagraph (A) of section 207(b)(2) of the Act applies.

NON-ROAD ENGINES (SECTION 210)

SUMMARY

The bill adds definitions of "non-road engines" and "non-road vehicles" to title II of the Act and also adds a new section 217 to the Act requiring the Administrator, within 24 months of enactment, to publish a list of all categories of non-road engines and non-road vehicles, together with estimates of emissions of the contribution each category makes to ambient levels of ozone and carbon monoxide in nonattainment areas and to oxides of nitrogen and total particulate levels. The bill authorizes the Administrator to promulgate standards applicable to emissions from categories of non-road engines or vehicles whenever the Administrator determines that a category or categories contributes significantly to pollution problems. When setting standards, the Administrator is to consider first standards equivalent in stringency to those for comparable motor vehicles or engines.

DISCUSSION

Emissions from cars, trucks and buses have been regulated under the Act for several years. For cars, regulation started in California in 1966 and nationally, in 1968. Major reductions from uncontrolled emissions levels have been achieved both by cars and, more recently, by heavy duty trucks and buses. Existing regulations and other provisions in the bill assure that still further reductions will be achieved by motor vehicles, the term used in the Act to denote vehicles that move on streets or highways.

There has been no similar regulation of engines used to operate vehicles or equipment off roads. In fact, the current Act does not explicitly authorize the Administrator to undertake such regulation.

Emissions from off-road and non-road engines and vehicles now make up a significant portion of pollution, especially in urban areas. While inventories of these emissions are not precise, estimates indicate the extent to whch they contribute to ozone and other pollution problems. Emissions inventories from EPA estimate that farm and construction equipment emit 3.7 percent of CO nationwide, 4 percent of nationwide NO_x, and 1.3 percent of total hydrocarbons. The South Air Quality Management District in California projects that off-road vehicles and engines in the year 2000 will be responsible for 10 percent of the area's VOC emissions, 13 percent of CO, and 16 percent of NO_x. And a preliminary study prepared for EPA by the Radian Corporation estimates that NO_x emissions from non-road diesel engines make up over 12 percent of total NO_x emissions nationwide, including 4 percent from diesel locomotives.

The term "non-road engines" includes a wide range of engine uses and vehlicles. The term includes, for example, diesel locomotives, farm and construction equipment, utility engines such as lawn and garden equipment, marine vessels, forklifts and airports vehicles. The definition in the bill for non-road vehicles is an inclusive one that covers all engines that are not used in motor vehicles, or in a vehicle solely for competition in vehicle racing, that are not regulated by standards promulgated under section 111 of the Act, and that are not subject to regulation under part B of title I of the Act, related to aircraft. For the purposes of the definition of non-road engines the phrase "used solely for competition in vehicle racing" means racing vehicles not capable of safe and practical use on streets and highways. The term "safe" does not mean merely that the vehicle lacks certain safety features required by the National Highway Traffic Safety Administration. Further, the phrase does not include those vehicles that are capable of being modified for safe and practical use on streets and highways.

The Administrator is required to ist by categories all non-road engines and vehicles and to estimate emissions of VOCs, NO_x, CO, and particulates from each category and the contribution each catgory makes to ozone and carbon monoxide ambient levels in nonattainment areas. Based on this information the bill requires the Administrator to regulate every category that contributes significantly to ambient concentrations of CO, ozone, or particulates or otherwise can reasonably be anticipated to endanger public health or welfare, for example, through emissions of toxic pollutants such as diesel particulates. The Administrator is not to divide the universe of non-road engines into so many categories that none, alone, is significant. Where the type of function performed or the design of engines is similar, engines should be aggregated for the purposes of determining the significance of contribution to the pollution problem.

The bill directs the Administrator, in setting control standards, to consider first the level of control required for comparable motor vehicle engines. Controls that work for diesel engines used in heavy duty trucks can also be effective on diesel engines in certain construction equipment, for example.

While the bill authorizes the Administrator to set standards for non-road engines, it does not preempt States from undertaking such regulation. There are compelling reasons not to preempt the States from acting. Specifically, in response to the California Clean Air Act, the California Air Resources Board is on schedule to propose and set standrds for six categories of non-road vehicles and engines over the next two to three years. California is, thus, once again well ahead of EPA in efforts to limit emissions from a significant group of polluting sources. EPA can and should benefit from the work being done in California, as can other States that determine that regulation of non-road engines is a valuable control to help meet emissions reduction requirements in the bill.

PROHIBITION ON PRODUCTION OF ENGINES REQUIRING LEADED GASOLINE (SECTION 211)

SUMMARY

The bill requires the Administrator to promulgate regulations to prohibit the manufacture after 1992 of engines that require leaded gasoline.

DISCUSSION

The adverse effects of lead on human health, especially its effects on children, are well-documented. Evidence is mounting that adverse effects, including effects on the central nervous system and decreases in cognitive ability, may be experienced at levels of lead contamination that were previously thought to be safe.

Lead emissions from motor vehicles have been dramatically reduced as regulation by EPA has lowered the lead content in gasoline. Lead has not been eliminated from gasoline because of the existence of engines that require some lead in fuel to function properly over time.

While all engines for motor vehicles currently being produced are designed to run without lead in fuel, other engines—for example, farm machinery and small gasoline-powered equipment—are not necessarily so designed.

In order to assure the total ban on lead in gasoline, the bill requires the Administrator to issue regulations prohibiting the manufacture or sale after 1992 of any engine that requires the use of leaded gasoline.

MOTOR VEHICLE TESTING AND CERTIFICATION (SECTION 212)

SUMMARY

The bill amends section 206 of the Act to require that an idle mode test element be added to the Federal test procedure and that the portion of production line vehicles of a particular model that must comply with emission standards when tested be increased from 60 percent under current regulations to 90 percent, in order for that model to be sold.

Section 202 of the Act is amended to prohibit the current practice in the certification process of averaging among engine or vehicle families or models among vehicle classes as a means for a manufacturer to comply with emissions standards.

The bill amends section 206 of the Act to require that EPA revise its certification test procedures to assure that vehicles are tested in a manner that reflects conditions under which vehicles are actually used.

DISCUSSION

Federal Test Procedures (FTP).—The 1975 FTP used by EPA to determine whether an engine family complies with emissions standards entails a driving cycle that consists of a 7.5 mile simulated trip run in a laboratory on a chassis dynamometer starting with a cold engine. Following a ten minute waiting period the trip is started again with a warmed-up engine. Overall the test has an average speed of 19.7 miles per hour, a top speed of 57 miles per hour, and 2.4 stops per mile. In designing the procedure, EPA intended to determine emission control device effectiveness in modes other than the specific ones used in the test. Unfortunately, it has become apparent that emissions during vehicle operation in modes other than the ones on the test are not adequately accounted for in current test procedures. For example, quick accelerations and decelerations account for high emission rates, and these conditions are not adequately represented in the test procedure. Also, emissions of NO_x are especially high when a vehicle is working under heavy loads, a circumstance not fully addressed by the current test.

The bill requires the Administrator to revise the Federal test procedures (FTP) within eighteen months of enactment and review the FTP every four years thereafter to assure that the FTP incorporates representative driving conditions throughout the nation. Conditions to be tested include those that represent the variety of fuels, temperatures, acceleration and deceleration, and altitude at which vehicles are likely to be driven. The bill explicitly requires that trucks rated at a gross vehicle weight of six thousand pounds or more be tested in a loaded mode that approximates the maximum weight the vehicle is designed to carry.

The bill also explicitly requires that the FTP be revised to add a test in the idle mode. This provision is designed to assure that vehicles will meet emissions standards when in heavily congested, stop-and-go conditions and on the I/M tests that most often test vehicles in the idle mode. The regulations adding an idle test and idle test mode to the FTP that is required by section 206(a) will also establish idle test standards under section 202. The useful life applicable to these standards is identical to the useful life applicable to the other standards for light duty vehicles. The Administrator may make 207(c) nonconformity determinations based on the idle test standards under section 202.

Production line testing.—Currently EPA conducts a selective enforcement audit to determine whether selected automobile models in production meet emission standards. Samples of vehicles are drawn from an assembly line and are tested. If, based on the sample, it is determined that 40 percent or more of the model line will fail to meet an emission standard, the certification for that vehicle line is suspended and the vehicles cannot be sold until the manufacturer can demonstrate that the problem has been corrected and the model line will meet the standards. The 40 percent figure is called the "acceptable quality level" (AQL).

The objective of the motor vehicle provisions of the Act is to assure that each new automobile meets emission standards. Because an AQL of 40 percent is not adequate to accomplish the objective, the bill requires that 90 percent of the vehicles in the model line sampled be expected to meet each standard or, in other words, that the AQL be 10 percent.

Emission averaging.—Under current regulations EPA permits manufacturers to certify compliance of vehicles with certain emission standards by averaging across engine families or between classes of vehicles. This averaging, though inconsistent with the current statute, is currently permitted by regulation in determining compliance with particulate standards for light-duty vehicles and light trucks and for heavy-duty vehicles, and with NO_x standards for all classes of trucks and heavy-duty engines.

Because resources are not available to allow emissions standards to be set for each and every type of engine and vehicle, standards represent levels of control that can be achieved by an entire class of vehicles, for example, by all automobiles or all light trucks. Thus, in the normal course of events, many models in a class—for example, those with different control technologies—will perform better than the standard because the standard was set to assure that certain other models will be able to comply with it. If averaging is permitted, some of the vehicles that are more difficult to control, but that are capable of meeting the standards, will be relieved of the necessity to reduce emissions to the level of the standard because other models produced by the same manufacturer—without any modification or increased controls—happen to perform better than the required level. The net result of averaging, in these cases, is more pollution than if every vehicle family were required to meet the standard.

Because of the potential for allowing increased emissions from vehicles, the bill prohibits the use of averaging with respect to compliance with any emissions standard established by the Agency under section 202 of the Act.

IN-USE COMPLIANCE—RECALLS (SECTION 213)

SUMMARY

The bill requires the Administrator to take into account information from State I/M programs in determining whether a class or category of vehicles conforms to applicable emissions standards in actual use, and thus, is subject to recall. The Administrator must respond within 60 days to a petition by a State to determine that a class or category does not conform to standards. The bill also authorizes the Administrator to require vehicle manufacturers to pay the costs of procuring and testing vehicles to determine if they conform to standards, once the Administrator has reason to believe that a class or category of vehicles may not be meeting the standards in use.

DISCUSSION

Under section 207(c) of the Act EPA routinely tests light duty cars and trucks to determine their compliance with exhaust and evaporative emissions standards when they are in actual use. Manufacturers of nonconforming vehicles may be required to recall and repair the vehicles.

EPA tests samples of vehicles by engine family. Vehicles that meet requirements for having been properly maintained according to a manufacturer's instructions are tested according to the Federal test procedure. This initial surveillance testing may identify potential noncomplying models, at which time additional testing is conducted on a larger sample of vehicles in that engine family.

The number of engine families tested annually has dropped dramatically since 1980. The number tested in 1980 was 50; in 1988, only 22; and in 1989, 30. EPA states that the effectiveness of the program has been maintained despite the drop in the number of survelliance tests conducted because the Agency, since the mid-1980's, has focused its resources on classes of vehicles with suspect emissions performance. These suspect classes have been identified by reviewing all available in-use emission data, including State I/M program data, EPA emission factor data, certification and selective enforcement audit data, manufacturer defect information, and California Air Resources Board testing. It is a fact, however, that resources for the in-use enforcement program has diminished greatly over the last decade.

The bill codifies existing practice, requiring that EPA take into account information collected from State I/M programs, in determing which vehicles to ~~test further~~ and, perhaps, recall. The bill also gives a State the right to petition the Administrator to make a determination of nonconformity. It is, of course, the case that a nonconformity determination can only be based on the failure of a class of vehicles to conform to regulations prescribed in section 202 of the Act. In order for the Administrator to respond affirmatively to a petition within the days days required by the bill, it will be necessary for a State to submit adequate data to permit the Administrator to make a determination that the class fails to comply with the standards and test procedures specified under section 202.

The bill also provides for resources to carry out recall survelliance and testing activities. Once the Administrator has reason to believe that a particular class of vehicles is not conforming to standards when in actual use, the Administrator may require the manufacturer of that class of vehicles to pay for EPA to procure and test the vehicles or engines needed to make a determination as to conformity. Funds received from a manufacturer are to be used by EPA to administer the recall program. The basis for the "reason to believe" would be any of the sources of information presently relied on by the Administrator to identify suspect classes of vehicles.

FUEL VOLATILITY (SECTION 214)

SUMMARY

New section 214 of the Act directs the Administrator to promulgate regulations to reduce evaporative emissions from motor vehicles. The regulations will require that the volatility, measured as Reid Vapor pressure (RVP), of gasoline sold during high ozone periods (the period between May 16 and September 15 each year) not exceed 9 pounds per square inch RVP. The Administrator is authorized to establish a lower number so long as it is achievable and appropriate for the purposes of protecting public health and welfare. The 9 pounds psi limit shall apply to gasoline sold, or offered for sale, or introduced into commerce for use in motor vehicles in class C areas (as defined by the American Society of Testing Materials as of the date of enactment of this section). With comparable reductions made in the violatity of fuels sold in other ASTM areas.

For fuel blends containing gasoline and 10 percent denatured anhydrous ethanol, a one pound per square inch RVP waiver is included.

DISCUSSION

Evaporative hydrocarbon emissions from gasoline-fueled vehicles occur when gasoline vapors expand in the fuel tank and when residual engine heat causes evaportion of fuel remaining in the carburetor and the fuel lines. These emissions are dependent on fuel volatility. Evaporative emissions are a major source of hydrocarbons and increased gasoline volatility causes excess hydrocarbon emissions. EPA estimates that evaporative emissions from fuel volatility account for eight percent of the total hydrocarbon inventory nationwide.

A comprehensive analysis issued by the EPA in November, 1985, concluded that the volatility of fuels in-use is significantly higher than the volatility of fuels used during vehicle certification under the Agency's title II regulations. These existing standards, which control evaporative hydrocarbon emissions, allow vehicle control systems to be tested with certification gasoline having a volatility ranging from 8.7 psi to 9.2 pounds per square inch RVP. The average volatility for commercial fuel is now 11.5 psi, with summertime volatility increasing to over 13 psi.

A significant portion of the increase in commercial gasoline volatility has been caused by increased use of butane and other low cost higher volatile additives in gasoline. EPA volatility data collected over several years suggest the trend toward increased volatility in gasoline will continue.

In March of 1989, EPA established summertime volatility control standards for gasoline to reduce vehicle evaporative emissions. The standards require gasoline volatility to be reduced to 10.5 pounds per square inch RVP/in class C areas.

Additional volatility reductions beyond those EPA has established are necessary to protect public health and welfare. New section 214 therefore establishes a standard requiring gasoline be reduced to 9 pounds per square inch RVP. The imposition of a 9 pound per square inch RVP will significantly reduce the level of evaporative hydrocarbon emissions in nonattainment areas and nationwide.

The reported bill includes a one pound volatility waiver for ethanol/gasoline blends containing 10 percent denatured anhydrous ethanol. This provision was included in recognition that gasoline and ethanol are mixed after the refining process has been completed. It was recognized that to require ethanol to meet a 9 pound RVP would require the creation of a production and distribution network for sub-nine pound RVP gasoline. The cost of producing and distributing this type of fuel would be prohibitive to the petroleum industry and would likely result in the termination of the availability of ethanol in the marketplace. Under this provision, the RVP limitations promulgated pursuant to this subsection for such ethanol/gasoline blends shall be one pound per square inch greater than the applicable Reid vapor pressure which apply to gasoline.

Reid vapor pressure of ethanol/gasoline blends is currently uncontrolled. Adding ethanol to gasoline increases the RVP of the blended fuel by approximately 3 to 10 percent. Generally, ethanol blends burn cleaner than pure hydrocarbon gasoline and thus cause fewer tailpipe emissions. The increase in RVP tends to cause increased evaporative emissions of volatile organic compounds (VOC's) from vehicles using ethanol blended fuel.

This provision would impose RVP controls on ethanol blends for the first time and would forego regulation of a very small percentage of the total nationwide volatile organic compounds emissions inventory. This provision will allow ethanol blending to continue to be a viable alternative fuel, with its beneficial environmental, economic, agricultural, energy security and foreign policy implications. Finally, this provision will remove the possibility that ethanol blends would be used to circumvent the proposed volatility restrictions.

DESULFURIZATION (SECTION 215)

SUMMARY

Section 215 prohibits the sale of diesel fuel with a sulfur content in excess of 0.05 percent (by weight) or which fails to meet a minimum cetane index of 40. This will limit the aromatic content of diesel fuels to current levels. Heavy duty engines certified for model years 1991 through 1993 may be certified using low sulfur fuel. Diesel fuel not intended for use as a motor fuel must contain dyes, within one year of enactment, in order to segregate visually the diesel fuels.

DISCUSSION

Although the agency was required to prescribe regulations applicable to emissions of particulate matter from classes and categories of vehicles manufactured during and after model year 1981 under provisions of the 1977 Clean Air Act amendments, EPA failed to establish regulations for heavy-duty trucks and buses. The agency finally promulgated regulations, under court order, in March, 1985, to be effective in the 1991 and 1994 model years. Thus, the mandated regulations will become fully effective some ten to thirteen years after the Congress required the agency to act.

In testimony a number of witnesses noted that diesel particulates cause cancer, genetic mutations and other health related ailments. Particulate emissions from diesel-equipped vehicles are formed as a result of incomplete combustion of the fuel. The particulates in diesel exhaust differ both in quantity and composition from particulates in gasoline engine exhaust. Diesel-equipped engines can emit 30 to 100 times more mass, on a gram per mile basis, than gasoline powered, catalyst equipped vehicles. Over 90 percent of diesel particulates are less than one micron in size and are therefore small enough to be inhaled and deposited deep within the lungs. EPA has reported that up to 10,000 chemicals may be adsorbed on the surface of diesel particulates and drawn deep into the lungs. Many of these chemical compounds are mutagenic in short-term bioassays, and have been found to cause cancer in laboratory animals.

The testimony documented that desulfurization of diesel fuel is the most cost effective short-term means of removing particulates from vehicle exhaust. It is estimated that the use of diesel particulate emission traps on vehicles would cost from $10 to $50 per pound of sulfur removed, while limiting the sulfur content in diesel fuel to a level of 0.05 percent as required in this section, would cost 54 cents per pound of sulfur removed. The nationwide average sulfur content in motor vehicle diesel fuel was 0.27 percent in 1986. Sulfur reduction to a 0.05 percent level is technically feasible. Local rules currently in effect for southern California limit the sulfur content of diesel fuel sold in the Los Angeles area to 0.05 percent of weight. California officials have stated that the increased cost of diesel fuel in their area due to desulfurization is three cents per gallon, which is much less than they had anticipated. In addition, EPA has stated that reducing the sulfur content of diesel fuel would significantly reduce corrosive wear and deposit formation, extending engine life and reducing maintenance costs. EPA concluded that these savings would be several times the cost of reducing sulfur at refineries. Thus, there is no net cost to the desulfurization requirement and there are direct economic and environmental benefits.

This new section prohibits the sale, after October 1, 1993, of diesel fuel for use in motor vehicles which has a sulfur content in excess of 0.05 percent by weight and which fails to meet a minimum cetane index of 40. The Administrator shall require manufactures and importers of diesel fuel which is not used as motor fuel to add dye to such fuel so that it can be segregated from diesel motor fuel. Heavy-duty vehicles must be certified with fuel meeting the sulfur content and cetane minimum requirements established in this section, beginning with model year 1994. Model year 1991 through 1993 heavy-duty vehicles must be certified with fuel containing no more than 0.05 percent sulfur.

These provisions are similar to the agreement concerning desulfurization reached in the summer of 1988 between the petroleum industry and engine manufacturers.

In addition to the benefits to be gained through reduction in particulate exhaust emissions the Office of Technology Assessment has estimated, based on low growth assumptions, that by 1995 a standard of 0.05 percent maximum sulfur content would decrease emissions of sulfur nationwide by 285,000 tons annually below the level expected if the current sulfur content of diesel fuel were maintained. Sulfur emissions are precursors of acid deposition.

Desulfurization for diesel is more effective in reducing particulate emissions in the short-term any of the exhaust after-treatment device options for two reasons. First, upon full implementation of this limitation on fuel sulfur content, the entire diesel vehicle fleet would be subject to control. Use of exhaust after-treatment devices would only affect new diesel vehicles. Second, this provision will enhance the ability of the heavy-duty engine manufacturers to meet the diesel particulate standards promulgated for the 1991 urban bus models and the 1994 heavy-duty truck standard. Without a sulfur content limit of 0.05 percent, heavy-duty engine manufacturers testified that they cannot meet the 1991 and 1994 standards because the exhaust control technology currently available is overwhelmed in operation by the sulfur content of the emissions.

This section also requires the Administrator to report to Congress within six months of enactment as to whether the 0.05 per centum by weight sulfur content requirement is necessary to assure compliance with the particulate emission standards specified in section 202(a)(3)(F) or in regulations under section 202, or to protect public health.

LEAD PHASEDOWN (SECTION 216)

SUMMARY

The sale of gasoline containing lead for use in motor vehicles is prohibited effective January 1, 1991. The Administrator may extend the effective date of the prohibition an additional two years, if the Administrator determines that a ban on leaded gasoline for highway uses will affect availability of fuels needed by farm vehicles.

DISCUSSIONS

Section 216 adds a new subsection (j) to section 211 of the Clean Air Act prohibiting the sale of leaded gasoline for use in "motor vehicles" after January 1, 1991. This prohibition completes a lead phasedown program which was begun by the Environmental Protection Agency in 1973.

Lead is added to gasoline to increase octane which prevents engine "knock." However, lead is an extremely damaging human toxicant and it impairs the operation of emissions control systems on automobiles.

Unleaded gasoline has been required for use in some automobiles since model year 1975 and in all vehicles produced beginning in model year 1980. Lead in the fuel "poisons" the catalytic converter which is installed in the tailpipe of light duty vehicles and light duty trucks. The catalyst oxidizes the carbon monoxide, hydrocarbons and oxides of nitrogen which are emitted by combustion to fuel in the engine. Thus, unleaded fuels have been required as a part of the title II program to reduce HC, CO and NO_x emissions and automobiles have been labeled "unleaded fuel only" and equipped with fillneck restricters to prevent the use of the larger nozzles on pumps dispensing leaded gasoline.

Nevertheless, a significant amount of "misfueling" has occurred because leaded gasoline has been marketed at prices substantially lower than unleaded blends. Misfueling rates up to 16 percent were common in the early 1980s and especially in areas which did not have inspection and maintenance programs. Even occasional misfueling (a few tankfuls of leaded gasoline) can significantly damage the performance of emission control systems. Emissions increases of 475 percent for hydrocarbons and 425 percent of carbon monoxide may occur as the result of misfueling a vehicle designed for unleaded gasoline. A 1988 EPA survey indicated that misfueling continues to be a significant problem—although the use (and availability) of leaded gasoline has declined dramatically in recent years.

In addition to the misfueling problem, evidence available to the Agency beginning in the early 1980s indicated that lead is much more harmful as a human toxicant than previously understood. High blood lead levels cause symptoms of acute toxicity, but even at low levels, lead decreases cognitive development in children (literally stealing the congnitive potential of our children measured as a loss of 3 to 4 IQ points on average for the 2 percent of children with blood lead levels above 30 micrograms per deciliter) and may contribute to hypertension, strokes and heart disease in the adult population. Lead is also classified as a probable human carcinogen.

In 1982 EPA promulgated a rule limiting the lead content of gasoline to not more than 1.1 grams of lead per gallon of gasoline. The lead content of leaded gasoline was further reduced to not more than 0.1 grams per gallon effective on January 1, 1986.

The benefits of the 1986 reduction were carefully estimated by EPA. The siginificant reduction in blood lead levels of children was estimated to save between $350 and $600 million per year in health care and compensatory education costs. The reduction in negative health effects for the adult population was also estimated to be significant. Cases of hypertension in adult males were projected to decrease by 52,000, heart attacks by 5,350, strokes by 1,115 and deaths by 5,160 per year. In addition, annual emissions of 305,000 tons of hydrocarbons, 94,000 tons of nitrogen oxides and 2,116,000 tons of carbon monoxide that would have been caused by higher misfueling rates were avoided. The overall monetary value of the benefits associated with the 1986 rulemaking was estimated to exceed $5 billion per year. The costs ranged from $441 to $608 million per year.

At the same time that EPA promulgated the reduction to 0.1 grams per gallon, it proposed a complete ban on the sale of leaded gasoline for use in highway vehicles. The preamble accompanying the proposed rule contained estimates of the health and environmental benefits of banning lead in 1990 as an alternative to continuing the 1986 standard. The benefit of the ban in terms of the health of children was quantified as a reduction in the number of children expected to experience elevated blood lead levels. The Centers for Disease Control has established a blood lead toxicity level at 25 micrograms per deciliter. A complete ban would result in 60,000 fewer children exceeding the toxicity level in 1991. In addition 18,000 fewer would exceed 20 micrograms/deciliter and 58,000 fewer would exceed 15 micrograms/deciliter. Although symptoms of acute toxicity are not seen at these lower levels, losses in cognitive development have been positively associated with these levels in large surveys.

The benefits to the adult population fom a lead ban in 1991 would include 91,403 fewer cases of hypertension, 298 fewer heart attacks, and 266 fewer deaths. In addition emission of criteria pollutants would be reduced by 451,000 tons of carbon monoxide, 64,000 tons of hydrocarbons and 29,000 tons of nitrogen oxides from the misfueling events that would be avoided.

In a communication received by the Committee in 1985, the Chairman of the Committee on Environmental Hazards of the American Academy of Pediatrics said:

> Although children's blood lead levels in the United States have decreased since 1976 in parallel with the reduction in the consumption of leaded gasoline, the problem of childhood lead absorption is by no means resolved. Data from the second National Health and Nutrition Examination Survey indicate that almost 700,00 young children have elevated blood lead levels . . . Every effort must be made to reduce the exposure of children to lead. There is no legitimate justification by which lead can be allowed to remain in gasoline in this country. Lead is not necessary in gasoline. The toxic effects which are produced in children by the absorption of lead from leaded gasoline are unconscionable, incalculable and irreversible. Intelligence lost as the result of exposure to lead can never be regained . . . The American Academy of Pediatrics urges the rapid and complete removal of all lead from gaoline. The lead phasedown must be completed on schedule. For the sake of the health of our children, no waivers and no exceptions can be allowed.

Concerns have been expressed about the impact of a complete ban on the sale of leaded gasoline with respect to wear on engines in certain classes of vehicles. In addition to increasing octane, lead also serves to lubricate valves and prevent early wear and failure that is called valve recession. This adverse effect may be experienced in engines with soft valve seats and may be a problem for some heavy duty farm engines, recreational vehicles, antique vehicles and other engines built to run on leaded gasoline. In fact, concern was expressed that the very low lead levels established by the 1986 rulemaking would not provide sufficient protection to prevent valve damage.

In response to these concerns and at the direction of the Congress as expressed in an amendment to the Food Security Act of 1985, EPA and USDA jointly conducted a study to determine whether engines used in the farm sector would experience significant increased wear as the result of using low lead or no lead gasoline. The test was carried out by operating a small number of engines representative of those found in farm vehicles at various loads using low lead and no lead gasoline and using unleaded gasoline containing various other additives which have been developed to prevent valve wear.

The study found that no excess damage to these engines was caused by operation on gasoline containing 0.1 gram per gallon lead. However, some engines operating on unleaded during heavy-duty cycles did show excessive valve recession. Therefore, EPA concluded that leaded gasoline or a fuel using a lubricant other than lead should continue to be available for farm engines. In its published findings, issued on September 30, 1988, the Agency indicated its belief that leaded fuels would continue to be available in regions with concentrated agricultural activity and that some additives that were tested appeared promising as substitutes for lead. It also indicated that it would continue to closely review the health and environmental effects of leaded gasoline with the promulgation of the ban still under consideration.

The results for this study are in marked contrast to studies conducted by other Federal agencies including the Defense Department and the U.S. Postal Service which found that operation of their vehicles with soft valve seats and designed for operation on leaded gasoline showed no excessive wear when operated on unleaded. This may sugest that vehicles operated on light duty cycles (including antique cars) will experience no adverse effects from a lead ban. both of these agencies now purchase unleaded gasoline for their "leaded gasoline" vehicles wherever the cleaner fuel is available.

The legislation bans the sale of leaded gasoline for use in motor vehicles which are defined in the Act to include vehicles which are designed to carry persons or property on the street or highway. This definition would exclude combines and tractors and other off-road vehicles. Leaded gsoline could still be sold for use in these vehicles. In addition, fuels with additives other than lead or lead additives packaged in small containers to be mixed with unleaded fuel by the owner or operator of an off-road vehicle could be used in areas where leaded gasoline was not available.

The legislation also allows the Administrator to delay the effective date of the ban, if there would be a widespread negative impact on availability of leaded gasoline for farm uses or if alternative valve lubricants are not available (either in fuels offered for sale or in additive packages). The ban is to be put in place as scheduled, unless the Administrator finds that alternative lubricants are not available.

FUEL QUALITY (SECTION 217)

SUMMARY

Section 217 of the bill adds a new subsection (k) to section 211 of the Act to require the Administrator to promulgate fuel quality regulations. Not later than 36 months after the date of enactment of the legislation, the Administrator is required to publish regulations establishing fuel quality specifications that minimize, to the extent economically and technically achievable, emissions from fuel combustion in engines. The regulations are to minimize emissions of hydrocarbons, carbon monoxide, oxides of nitrogen, particulate matter and hazardous air pollutants over the useful life of vehicles and engines certified for manufacture under title II of the Act. The regulations go into effect on January 1, 1994. If the Administrator fails to promulgate such regulations, it is unlawful after January 1, 1994, to sell, offer for sale or introduce into commerce any fuel that does not contain additives to prevent accumulation of deposits in fuel-injected engines.

New section 211(k)(1) of the Act authorizes the Administrator to promulgate regulations applicable to fuel refiners, distributors, marketers or consumers establishing specifications for fuels to reduce emissions of pollutants subject to a standard under title II of the Act or hazardous emissions from motor vehicles. The Administrator shall consider other environmental effects and require there be no increase in emissions of any other pollutant subject to a standard under title II or any hazardous air pollutant. Regulations are to be stated as performance standards and may be satisfied by any fuel that achieves comparable emissions reductions and otherwise satisfies the specifications.

DISCUSSION

Subsection (k)(1) requires the Administrator to establish fuel quality standards to maximize engine performance and to minimize emissions from the combustion of fuels in vehicles and engines. Engines may prematurely wear out due to impurities in the fuel. Such fuel can clog fuel injectors, cause additional corrosion and otherwise affect engine performance, and cause an increase in air pollution emissions from the engine. In addition, fuel additives, such as detergents, are available to maximize the performance of engines and minimize emissions. This paragraph requires the Administrator to assure high fuel quality and require use of detergents to maximize engine performance.

In the event that the Administrator fails to promulgate regulations, fuel may not be sold, offered for sale or introduced into commerce that does not contain additives that prevent the accumulation of deposits in fuel-injected engines. This is to assure that even in the event of agency inaction engine durability will be enhanced through use of fuel additives.

Paragraph (2) is general authority for the Administrator to establish fuel specifications and to require availability of alternative fuels that reduce air pollution emissions. Such requirements may apply to specific nonattainment areas. Any such alternative fuel requirement must take into account the environmental effects of alternative fuel use and production. For example, concerns have been raised about the impacts on carbon dioxide emissions from coal-derived methanol. Carbon dioxide is a leading greenhouse gas. Increased CO_2 emissions from the coal conversion process would exacerbate an already serious global warming problem. The overall environmental effects must be taken into account when assessing the impact of the use of the fuel.

Alternative fuels are to be used to reduce emissions of air pollutants. Decreases in one or more pollutants cannot be justified to allow increases in other pollutants. Thus reductions in emissions of one pollutant, such as hydrocarbons, could not be justified if there is an increase in other pollutants, such as oxides of nitrogen or formaldehyde. An integrated, comprehensive emissions assessment is to be performed before selecting a particular fuel for use.

Fuel additives can present a significant threat to public health and the environment. For instance, lead is a fuel additive used to increase octane and provide lubrication for engine valves. Its negative impact on the neurological development and cognitive ability of children is well-documented. In addition, lead may poison the catalytic converters which remove other pollutants including hydrocarbons, oxides of nitrogen and carbon monoxide from exhaust. As a result, the Environmental Protection Agency has promulgated regulations to phasedown the use of lead additives in gasoline fuels.

Other additives which may pose a significant threat to public health include ethylene dibromide and ethylene dichloride (used as lead scavengers). EPA has also proposed a voluntary testing program on the health effects of methyl tertiary butyl ether (MTBE), another octane enhancer now used in approximately 20 percent of the gasoline fuel sold in the U.S. MTBE is to be listed as a hazardous air pollutant pursuant to the amendments made by in section 301 of the bill. The combustion of the methanol component of MTBE may also significantly increase formaldehyde emissions. Formaldehyde is a potent human carcinogen and a highly reactive precursor of ozone pollution.

There is less evidence on the emissions, exposure and potential adverse health effects which may be associated with lubricant formulations (motor oils). The contribution of lubricants to vehicle emissions is, in any event, only a small portion of the pollution in the exhaust from a motor vehicle in comparison to the emissions which are attributable to fuels and fuel additives.

In its 1985 air toxics strategy, the agency recognized that fuel additives may be causing a significant threat to public health and as part of that strategy EPA indicated that it would be proposing a series of protocols for the testing of fuel additives. Only the MTBE tests have been proposed to date.

Section 211(b) of the Clean Air Act gives the Administrator authority to require the manufacturer of any fuel additive to "conduct tests to determine potential public health effects of such fuel additive." Section 211(e) requires the Administrator to implement this requirement through regulations to be issued not later than three years after enactment (the language was enacted in 1977) applying to new fuel additives before their introduction into commerce and for additives already in commerce. These regulations have not been established by the Agency.

Section 211(c) gives the Administrator authority to "prohibit the manufacture, introduction into commerce, offering for sale or sale of any fuel or fuel additive . . . if . . . any emissions product of the fuel or fuel additive causes, or contributes, to air pollution . . ."

The Agency should implement the authorities contained in section 211 with respect to fuel additives by developing criteria (based on factors such as emissions of the additive or combustion byproducts, impact of the additive or byproducts on the emissions control systems of motor vehicles, exposure to the additive, byproducts or atmospheric transformation products and the potency of the additive, byproduct or transformation products as human and environmental toxicants) for testing determinations. Each additive should then be evaluated according to the criteria and testing programs for additives of concern should be commenced using the authority of section 211(b). As the Agency has not implemented already enacted non-discretionary provisions of law in this respect, this activity is to be completed on an expedited schedule.

OXYGENATED FUELS (SECTION 218)

SUMMARY

New section 218 requires that gasoline sold in carbon monoxide nonattainment areas during the period from October 1 and March 31 each year, beginning October 1, 1991, must contain an oxygen content greater than 3.1 percent by weight.

Not later than 9 months after the date of enactment the Administrator is required to promulgate guidelines that allows fuel sellers to exchange oxygen credits with others in the same nonattainment area, provided that credits are generated by the sale of fuel with more than 3.1 percent oxygen are sold to offset the sale of fuel with less than 3.1 percent oxygen.

The Administrator must also promulgate regulations that require that pumps dispensing oxygenated gasoline must be labeled with a notice that the fuel is oxygenated and will reduce carbon monoxide emissions from motor vehicles.

The Administrator is given authority to waive the fuel oxygen requirement in any area where it would interfere with the attainment of any other ambient air quality standard.

DISCUSSION

This provision mandates the use of oxygenated fuels in carbon monoxide nonattainment areas. Carbon monoxide is emitted directly as a pollutant and generally the result of imperfect combustion in vehicle engines.

Oxygenated fuels offers a means for significant reduction in carbon monoxide levels, particularly at higher elevations. The Congressional Research Service estimates oxygenated fuels would reduce carbon monoxide emissions from pre-1981 vehicles by 24 percent or more. Reductions in later models would be lower due to their use of three way catalysts and oxygen sensors in the emission control systems. Emission reductions at higher elevations can be expected to be greater.

This provision mandates the use of oxygenated fuels from October to April because most carbon monoxide exceedances occur during the winter months due to colder ambient temperatures, atmospheric temperature inversions and, in some areas, the combined effects of high altitude and climatic conditions.

Increasing the oxygen content of gasoline may assist some nonattainment areas reach attainment. In addiction, many areas now in attainment may find it possible to maintain attainment through greater use of oxygenated fuels.

Testimony last year documented the impact of oxygenated fuels on reduced carbon monoxide emissions. The dominant component affecting emissions levels of these fuels is the oxygen content. Oxygenated fuels, containing oxygen via an alcohol or ether blended with gasoline, have been shown to be effective in lowering carbon monoxide emissions from motor vehicles. Emission reductions are directly attributable to the oxygen contained in these fuels by leaning the air/fuel ratios of the fuel. Witnesses before the Subcommittee favored an oxygen content between 2 percent and 3.7 percent by weight. Oxygen content less than 2 percent does not have a significant impact upon carbon monoxide emissions. Increasing the level of oxygen beyond 3.7 percent may affect fuel characteristics and impact storage stability and volatility.

Currently several basic fuel blends are in use as oxygenated fuels. These include gasoline/ethanol, gasoline/methanol and gasoline/methyl tertiary butyl ether (MTBE).

Ethanol producers receive a 60 cents per gallon federal tax credit, making 10 percent ethanol blends exempt from 6 cents out of the 9 cents per gallon federal tax on gasoline. An alternative ethanol-based product is ethyl tertiary butyl ether (ETBE), more useful than ethanol because it is easier to blend and transport, and because it forms a less volatile mixture with gasoline, which could reduce ozone formation until recently did not qualify for a blenders credit. Shortly after the Committee completed its markup of this legislation, the U.S. Department of Treasury ruled that ETBE would qualify for a blenders credit under federal income tax.

One consequence of this subsidy is that revenues collected for the Highway Trust Fund were $485 million lower during fiscal year 1987 than would have been the case without the ethanol tax credit, according to the Treasury Department. The highwawy Users Federation estimates that federal and state highway funds together lose $660 million per year. The Federal Highway Trust Fund currently collects revenues faster than they are authorized to spend them.

This loss is offset by several benefits. The current ethanol sales (8 percent to 9 percent of motor fuels are gasohol) costs the highway trust fund approximately $485 million per year. But producing these fuels consumes 340 million bushels of surplus grain reducing federal agricultural subsidies by $600 million. The budgetary effect of the current highway excise tax exemption is positive.

Second, between 8 percent and 9 percent of the fuel currently sold already contains ethanol. Some of this is sold in carbon monoxide nonattainment areas. In fact, several nonattainment areas require it to be used. Thus, the cost of a *new* federal mandate is reduced as ethanol fuels are already being used in areas counted above.

Third, the MTBE waiver is not likely to stay at 2.7% oxygen. More likely, the makers of MTBE will seek a waiver at 3.1% oxygen, if this provision is enacted. It is expected that EPA would grant the waiver and MTBE could be added to gasoline to fulfill the requirement without an ethanol offset. That would further reduce the cost to the trust fund.

MISFUELING (SECTION 219)

SUMMARY

Section 219 of the bill amends section 211(g) of the Act to prohibit two types of misfueling. First, any person (including an individual) is prohibited from introducing (or causing or allowing the introduction of) leaded gasoline into a vehicle which is designed to operate exclusively on unleaded gasoline. Second, any person (including an individual) is prohibited from introducing (or causing or allowing the introduction of) high sulfur content diesel fuel into a motor vehicle, effective October 1, 1993. These prohibitions are enforceable under 211(d) of the Act.

This section replaces existing section 211(g), which provides that prior to October 1, 1982, small refiners may not be required to reduce the lead content of the gasoline they produce to the same extent as large refiners. Small refiners have been subject to the same lead content limitation as large refiners since July 1, 1983, so existing section 211(g) has no continuing effect.

DISCUSSION

Misfueling a vehicle designed to run on unleaded gasoline with leaded gasoline can significantly damage the effectiveness of the vehicle's catalytic converter. While the emissions impact of such misfueling depends upon its duration and certain vehicle characteristics, emission increases of 475 percent for hydrocarbons (HC) and 425 percent for carbon monoxide (CO) can easily occur. In EPA's 1988 Motor Vehicle Tampering Survey, misfueling was found in 10 percent of the unleaded vehicles not covered by an inspection/maintenance (I/M) and/or anti-tampering program. In areas with such programs misfueling still occurred, although at lower rates.

Current EPA regulations prohibit gasoline retailers and wholesale purchaser-consumers (self-fueled fleet or large-volume users), as well as their employees and agents, from introducing, or causing or allowing the introduction of, leaded gasoline into vehicles designed to run solely on unleaded gasoline. Individual vehicle owners and operators are not prohibited from such misfueling, however. Because the impact of misfueling is the same no matter who performs this activity and because self-service refueling is done much more frequently than "full-service" refueling, it is equitable and necessary to prohibit all misfueling of unleaded vehicles.

The bill prohibits any person from introducing (or causing or allowing the introduction of) leaded gasoline into any motor vehicle which fits into one or more of four categories:

(1) the vehicle is labeled "unleaded gasoline only";

(2) the vehicle is equipped with a gasoline;

(3) the vehicle is a 1990 or later model year; or

(4) the vehicle is one which the person knows or should know is designed solely for the use of unleaded gasoline.

The first two categories are those contained in the EPA regulations. The label provision is intended to include dashboard labels as well as those on the outside of vehicles. The third category is included because EPA has promulgated regulations requiring that all gasoline-powered motor vehicles certified in those model years (including heavy-duty vehicles and motorcycles) must be certified solely on unleaded gasoline.

The fourth category is intended to cover other vehicles which the person knows or should know are designed for unleaded gasoline use. All passenger cars since the 1980 model year (most since model year 1975) have been certified to run only on unleaded gasoline, as have all light-duty trucks since model year 1982. It is therefore expected that a person should know that a relatively late-model car or truck may not lawfully be fueled with leaded gasoline. Similarly, if there are indications that an unleaded gasoline label has been removed or that there has been tampering with a filler inlet, a person should know the vehicle was designed to run solely on unleaded gasoline.

In section 215 of the reported bill, the manufacture, sale, offering for sale, dispensing and transport of high sulfur content diesel fuel is prohibited starting on October 1, 1993. The use of high sulfur content diesel fuel in 1994 and later model year heavy-duty diesel vehicles may reduce the effectiveness of certain after treatment devices expected to be installed on such vehicles to assure compliance with particulate emission standards promulgated by EPA, and thus lead to higher particulate emissions. To deter such negative effects, the bill prohibits this type of misfueling by any person.

URBAN BUSES (SECTION 220)

SUMMARY

The bill replaces existing Section 212 of the Act with a new section that requires the Administrator to promulgate regulations requiring (1) the use of low polluting fuels in new urban buses operating primarily in a metropolitan statistical area or a consolidated metropolitan area with a population in 1980 of 1,000,000 or more, and (2) that emissions of particulate matter shall not exceed 0.10 gram per brake horsepower-hour. The regulations shall require that beginning in 1994, all new urban buses in these areas that are purchased or placed into service must be capable of operating and must operate exclusively on low polluting fuels. The regulations issued by the Administrator shall prescribe the following schedule phasing in the applicability of the requirements: by 1991, 10 percent of all new urban buses purchased or placed into service must operate on low polluting fuels; 25 percent by 1992; 60 percent by 1993; and 100 percent by 1994 of all new urban buses must operate on low polluting fuels.

DISCUSSION

The purpose of this section is to reduce emissions of diesel particulates from urban buses.

In testimony before the Committee, a number of witnesses stated that diesel particulates cause cancer, genetic mutations and other health related ailments. Particulate emissions from diesel-equipped vehicles are formed as a result of incomplete combustion of the fuel. The particulates in diesel exhaust differ both in quantity and composition from particulates in gasoline-powered, catalyst-equipped vehicles. Diesel-equipped vehicles can emit 30 to 100 times more mass on a gram per mile basis than gasoline-powered, catalyst-equipped vehicles. Over 90 percent of diesel particulates are less than one micron in size and are therefore small enough to be inhaled and deposited deep within the lungs. EPA has reported that up to 10,000 chemicals may be absorbed on the surface of diesel particulates that are inhaled into the lungs. Many of these chemical compounds are mutagenic in short-term bioassays, and have been found to cause cancer in laboratory animals.

Urban buses are a major source of diesel particulate emissions which can be reduced through the use of low polluting fuels. This section requires that all new urban buses purchased or put into service by 1994 in metropolitan statistical areas with a 1980 population of 1,000,000 persons or more, must be capable of operating, and must be exclusively operating on low polluting fuels. In order to meet this requirement with the least amount of disruption, this section requires the Administrator to prescribe the following schedule for phasing in the applicability of the requirements; 10 percent of new urban buses purchased or placed into service in model year 1992; by 1992, 25 percent; by 1993, 60 percent; and by 1994, 100 percent of all new urban buses must operate on low polluting fuels.

ENFORCEMENT (SECTION 221)

SUMMARY

Section 221 of the reported bill broadens and strengthens the enforcement provisions of title II of the Act in several ways.

First, the section amends section 203(a)(2) of the Act to prohibit a manufacturer or other person from refusing to pay for the procurement or testing of vehicles or engines by the Administrator under new section 207(c) authority added by section 213(b) of the bill.

Second, section 203(a)(3) of the Act is amended to prohibit an individual from removing or rendering inoperative (tampering with) any component of a vehicle emission control system after its sale to an ultimate purchaser and to make illegal the manufacture, sale or offering for sale of devices that bypass, defeat or render inoperative such a component ("defeat devices"). Tampering by individuals and the manufacture, and the sale or offering for sale of defeat devices are made subject to a civil penalty of up to $2,500.

Third, this section of the bill revises section 205 of the Act to increase from $10,000 to $25,000 the maximum civil penalty that can be levied for a violation of certain vehicle-related prohibitions in section 203(a) of the Act. The section also provides that violations of title II recordkeeping or reporting requirements are calculated on a per day basis.

Fourth, new authority is provided to the Administrator to assess administrative penalties for violations of sections 203(a) (motor vehicle and engine provisions), 211(d) (fuel and fuel additive provisions), 216(b) (carbon dioxide emission standards), and 217(e) (nonroad engine and vehicle provisions). The maximum civil penalty that may be assessed by the Administrator under this authority is $200,000. Any such assessment can only be made after an opportunity for a hearing before the Administrator is provided, and the amount of the penalty assessed is to be based on the consideration of statutorily-prescribed factors. The Administrator is also authorized (as at present) to bring a civil action in Federal district court to assess and recover any civil penalty prescribed in title II of the Act, and similar factors are prescribed for consideration by the court in determining the penalty amount.

Fifth, this section revises the section 211(d) penalty provision, which currently provides for a mandatory forfeiture of $10,000 per day for violations of section 211 or fuel or fuel additive regulations issued under that section. The mandatory forfeiture provision is replaced with a provision for a civil penalty of up to $25,000 per day for each violation. In addition, the section clarifies that where violations of fuel standards are based on a multi-day averaging period, each day during the averaging period constitutes a separate day of violation. This section of the bill also provides injunctive authority to restrain violations of fuel statutory provisions and regulation, as is already available in the Act for violations of motor vehicle and stationary source requirements.

DISCUSSION

Experience with the mobile source provisions in title II of the Act has shown that the enforcement authorities in this title need to be strengthen and broadened in several ways. Most of the title II enforcement authorities have not been amended since 1970, and the impacts of inflation and nearly two decades of enforcement experience need to be accounted for by updating these authorities.

Anti-tampering.—Current law prohibits manufacturers, dealers, service station or garage operators, fleet owners or those in the business of leasing vehicles from removing or disabling ("tampering with") components of vehicle emission control systems. Individual owners or operators of vehicles are not currently prohibited from performing the same activities.

In its 1988 Motor Vehicle Tampering Survey, EPA concluded that 23 percent of the passenger cars and light-duty trucks surveyed in areas not covered by inspection/maintenance (I/M) programs and/or anti-tampering programs (ATP) showed evidence of tampering with at least one component. Significant amounts of tampering were also found in ATP-only areas (17 percent) and I/M plus ATP areas (16 percent).

Tampering can cause dramatic increases in emissions of hydrocarbons (HC), carbon monoxide (CO) and nitrogen oxides (NO_x). For example, a missing or damaged catalytic converter can increase HC and CO emissions by an average of 475 percent and 425 percent, respectively. For vehicles equipped with three-way converters, substantial increases in NO_x emissions are also expected. The 1988 Tampering Survey found tampering with the catalytic converter on 8 percent of the vehicles in areas without an I/M or anti-tampering program. The survey found the air pump to be the single most tampered component (11 percent of equipped vehicles). By tampering with the air-pump system, the motorist can increase HC emissions by 200 percent and CO emissions by 800 percent.

The amendment to section 203(a)(3)(A) of the Act made by the bill establishes an individual's liability for knowingly tampering with an emission control component. Because the adverse air quality effects of tampering do not depend on what person performs the tampering, it is important to include individual vehicle owners and operators in the tampering prohibition. Individuals discovered through I/M programs or other means to have knowingly impaired a vehicle emission control system would be subject to civil penalties of up to $2,500 per vehicle. The bill does not require sweeping new enforcement initiatives to be undertaken by EPA or the States to identify possible instances of tampering by individuals.

The amendment also provides that a prohibited act of tampering is not deemed to occur until after a vehicle (or engine) has been subsequently released from the custody and control of the person who performed the tampering (in the case of tampering by manufacturers, dealers, repair facilities, and most others subject to the current tampering prohibition) or after it has been subsequently operated on a street or highway (in the case of tampering done by a fleet operator or individual). The purpose of this provision is to make clear that legitimate repair activities that require temporary removal or replacement of emission control components are not subject to penalties under this section.

The bill also makes illegal the manufacture, sale, or offering for sale of so-called "defeat devices" that render inoperative elements of a vehicle emission control system. Such devices include "test tubes" used to replace catalytic converters on vehicles. They also include aftermarket computer programmable read-only memory chips that enrich the air/fuel mixture, increasing emissions, or bypass emission control devices. Although the installation of defeat devices is tampering and is currently prohibited under the Act for certain classes of persons, the Act does not now explicitly prohibit the manufacture or sale of such devices. Presently, EPA must show that the manufacture or sale of a defeat device is a violation of section 203(a) by proving that such an activity causes tampering by a regulated party. See, e.g., *Ced's Inc.* v. *U.S. E.P.A.*, 745 F. 2d 1092 (7th Cir. 1984). Rather than require such an indirect and cumbersome method of proof, a new section 203(a)(3)(B) has been added to the Act to clearly prohibit the manufacture, sale, or offering for sale of such devices where it is known or should be known that they will be used for tampering.

Civil penalties for vehicle-related violations.—The maximum civil penalty under section 205 for violations of section 203(a)(1) (prohibition on introduction into commerce or importation of non-conforming vehicles), 203(a)(2) (recordkeeping/reporting/inspection requirements) or 203(a)(4) (warranty/labeling/recall violations) by any person and of section 203(a)(3)(A) (tampering prohibition) by a manufacture or dealer have been increased from $10,000 to $25,000. Violations of section 203(a)(1), (3)(A), and (4) are calculated on a per vehicle or engine basis. Violations of section 203(a)(2) are calculated on a per day basis. The maximum penalty for violations of section 203(a)(3)(A) by persons other than a manufacturer or dealer remains at $2,500 per vehicle or engine.

The penalty increases made in this portion of the bill confirm title II penalty provisions to the penalty provisions of title I and of other environmental statutes, such as RCRA and the Clean Water Act. The increased penalty amounts should provide a stronger deterrent against violations of the relevant provisions, especially with regard to more expensive vehicles.

Calculation of penalties for violations of the recordkeeping, reporting and inspection requirements of section 203(a)(2) on a per day basis is also intended to make this provision consistent with the method of calculating penalties for similar types of title I violations and to provide an adequate deterrent against such violations.

Administrative assessment of penalties.—This section of the bill provides that civil penalties up to a certain amount may be assessed by the Administrator, not only against individual owners for tampering and against manufacturers and sellers of defeat devices, but for all other acts prohibited under section 203(a) of the Act. Administrative assessment of penalties prescribed in section 211(d) for fuel or fuel additive violations, section 216(b) for carbon dioxide emission standard violations, and section 217(e) for nonroad vehicle or engine violations is also authorized. Current law provides that penalties can be sought only through judicial proceedings brought in an appropriate United States district court. The Administrator may still seek civil penalties for any title II violation in district court under the reported bill.

The maximum civil penalty amount that can be administratively assessed under this authority is limited to $200,000. This maximum is intended to be applied on a per violator per penalty assessment proceeding basis. Thus, the largest penalty that could be assessed (or sought) in a single administrative case against a specific party is $200,000.

The new provision gives the Administrator the authority to assess such a penalty by an order made on the record after an opportunity for a hearing. The Administrator is to determine the amount of the penalty taking several specified factors into account. The list of factors to be considered is not intended as an exclusive enumeration but as a guide to the Administrator.

The Administrator is authorized to issue rules for "discovery procedures for hearings" under this provision. This provision is intended to allow the Agency to establish by regulation all necessary procedural requirements to carry out the new administrative assessment authority, not just those related to discovery, such as it has done in 40 CFR Part 22 under administrative assessment authorities in other environmental statutes.

This provision is not intended to preclude the Administrator from utilizing the informal notice of violation (NOV) enforcement process developed for fuels and certain other mobile source violations. The Administrator may continue to issue such NOVs to alleged violators of title II provisions and to settle such matters to the extent authorized by law, prior to commencing a formal administrative penalty assessment procedure or referring a case to the Department of Justice for the filing of a civil action in district court.

A person against whom a penalty is assessed may seek judicial review of the administrative order in an appropriate United States court of appeals. If a properly assessed penalty is not paid, collection may be sought by the Attorney General in an appropriate district court of the United States where the validity, amount and appropriateness of such penalty will not be subject to review. Failure to timely pay an administratively-assessed penalty will result in payment of interest at the rates for underpayment of income taxes prescribed in section 6621(a)(2) of the Internal Revenue Code, attorneys fees, collection costs, and a quarterly nonpayment penalty.

The Administrator is authorized to issue subpoenas for witnesses and documents in connection with administrative penalty assessment hearings. Such subpoenas are enforceable in appropriate United States district courts. This section also authorizes nationwide service of process in district court civil penalty actions under section 205(b) of the Act, in order to provide authority consistent with that currently in section 204(b) of the Act for injunctive proceedings.

The addition of administrative civil penalty assessment authority made by this section of the bill will give the Administrator a less costly and more expeditious enforcement tool that nonetheless assures due process for alleged violators.

Fuels violations.—Section 211(d) of the Act currently provides for a mandatory forfeiture of $10,000 per day for violations of section 211 or fuel additive regulations issued thereunder. The amounts of civil penalties that can be imposed under this provision have been too low to recoup the economic benefit of violation in some cases. For example, in the lead phasedown program owners of very large refineries could pay the $10,000 forfeiture and still realize an economic benefit if they added as little as 0.20 gram of excess lead to each gallon of leaded gasoline produced. Estimated economic benefits in excess of $50,000 per day have in fact resulted from lead phasedown violations by at least one refiner. Although fuels violations to date have been primarily related to lead, it is anticipated that the bulk of future violations will be violations of fuels regulations recently promulgated or required by provisions in the bill—for example, gasoline volatility and diesel sulfur content—and of section 211(f) waiver requirements. It is very important that adequate penalties be available for such violations, particularly since other octane boosters, for example, alcohols, could yield economic benefits similar to lead when used illegally in gasoline.

This section of the bill changes the section 211(d) penalty amount from a mandatory forfeiture of $10,000 per day of violation to a maximum penalty of $25,000 per day of violation. This penalty amount applies to each day of each violation. For example, if a refiner commits a single violation of both the lead phasedown and the volatility regulations on the same day, the maximum penalty would be $50,000 for that day, not $25,000.

This penalty provision will help to recoup the economic benefit of fuels violations. This increase in the penalty amount will also account for the effects of inflation on the value of money since the current penalty amount was enacted in 1970. Changing the type of penalty from a mandatory forfeiture to a maximum penalty will allow a court or administrative law judge the flexibility to impose a penalty based on consideration of all relevant factors in each particular case.

Language is also added to section 211(d) regarding violations of fuels standards which are based on a multi-day averaging period, such as the quarterly lead phasedown standard. This language makes clear that each day during the averaging period is a separate day of violation. This provision overrules the decision in *U.S. v. Hill Petroleum,* Civ. No. 85-0184C (W.D. La., July 29, 1986). Such a clarification of section 211(d) will also assure that appropriate penalties can be imposed for violations of any fuels regulations with multi-day averaging provisions that EPA may promulgate in the future.

There is currently no explicit provision in the Act for injunctive relief for section 211 fuels violations. Continuous violations of up to three years in length have occurred under the lead phasedown program, and the Agency has had no explicit section 211(d) authority to enjoin such actions. Lengthy violations could also occur under other fuels regulations or statutory provisions. The bill adds a provision providing for injunctive relief for fuels violations as new section 211(d)(2) of the Act. This provision makes available for fuels violations the same type of civil remedies as are available for other mobile and statutory source violations, that is, both civil penalties and injunctive relief.

The new administrative assessment authority, the fuels injunctive relief provision, and the increased title II penalty provisions apply to violations that occur or continue on or after the date of enactment of the bill. Where the date of the violation cannot be determined, for example, a tampering violation, it will be assumed to be the date on which it is discovered.

Consideration of Federal Transportation and Environmental Policies (Section 222)

This section presents congressional findings and intent with respect to the use of new technologies and fuels by public transit vehicles to improve air quality, the expense of installing and using the new alternatives, the limited Federal funding for maintaining, improving and expanding public transit systems, and the need for Federal, State and local governments to encourage increased use of public transit through, among other measures, adequate funding.

Title III—Air Toxics

BACKGROUND DISCUSSION

Process Releases. There are two kinds of pollutants regulated under the Clean Air Act. One group, called criteria pollutants, are emitted in millions of tons and are air pollution problems across broad regions of the country. There are six criteria pollutants including sulfur dioxide, carbon monoxide, lead, ozone, nitrogen dioxide, and particulates. EPA sets ambient air quality standards for each of these pollutants and States must take actions to assure that the standard is not exceeded. Issues related to criteria pollutants are addressed in titles I, II, and IV of the bill.

The other kind of pollutants are called hazardous air pollutants on air toxics. They are generally cancer-causing substances, but other health and environmental problems may also be caused by toxics.

There are hundreds of air toxics of concern. Some examples are mercury, arsenic, asbestos, benzene, radionuclides, trichloroethylene (a solvent) perchlorethylene (dry cleaning fluid), ethylene oxide (hospital sterilant), toluene (a constituent of gasoline), ammonia, ethylene and propylene (building blocks in plastics), methyl isocyanate (the chemical released in the Bhopal accident and a pesticide feedstock), and dioxin (a product of combustion whenever there is chlorine in the fuel).

OSHA regulates 500 toxics in the workplace. A few states with active programs have regulated a total of 708 different air toxics. Recently major manufacturing facilities were required to report their air toxics emissions. The total for the firms reporting was 2.7 billion pounds per year. That is estimated to be about one-fifth of all emissions.

Under the Clean Air Act, EPA is to regulate these toxics by setting emissions standards limiting the amount of the pollutant that can be emitted by any particular source. The standard is to be set at a level which "provides an ample margin of safety to protect public health".

The law has worked poorly. In 18 years, EPA has regulated only some sources of only seven chemicals. One reason the law has worked poorly is the standard of protection required. "An ample margin of safety "has been interpreted by many to mean zero exposure to carcinogens, because any amount of exposure may cause a cancer. EPA has not been willing to write standards so stringent because they would shutdown major segments of American industry. The legislation reported by the Committee would entirely restructure the existing law, so that toxics might be adequately regulated by the Federal Government.

In April of 1989 EPA issued the first Toxic Release Inventory compiled from reports required by the Emergency Planning and Community Right-to-Know Act of 1986. The EPA data indicated that toxic releases to the air from major manufacturing facilities were approximately 2.7 billion pounds in 1987. The largest amounts of emissions were in Texas (240 million pounds), Ohio (173 million pounds), Louisiana (138 million pounds), Tennessee (135 million pounds) and Virginia (132 million pounds).

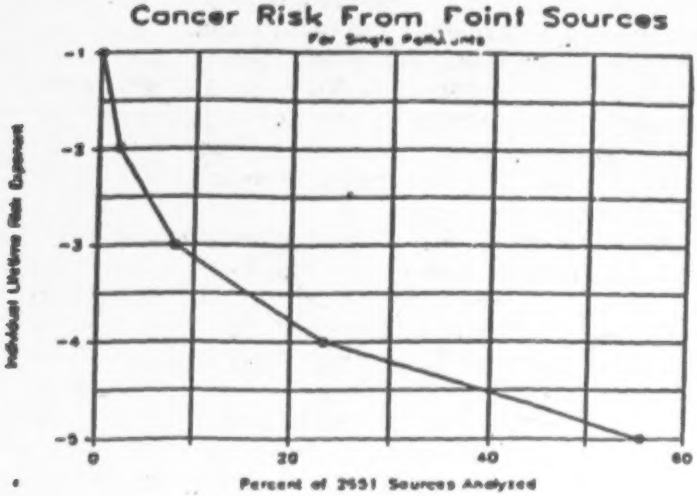
Chemicals most frequently released included toluene, ammonia, acetone, methanol, carbon disulfide, trichloroethane, methyl ethyl ketone, xylene, dichlormethane and chlorine. Actual emissions are likely to be two to five times higher, as the reporting requirement only applied to a fraction of the sources which are known to emit toxic pollutants.

In a 1989 study examining the potential cancer-causing effects of exposure to air toxics, EPA estimated a national annual cancer incidence of approximately 2700 cases as the result of exposure to some 15–40 toxic air pollutants. This would mean that 190,000 of the Americans now alive (2700 annually x 70 year life span) might be expected to contract cancer from exposure to air toxics. Again, this estimate may be low as a much larger number of air pollutants have been identified as potentially toxic.

In 1987 the South Coast Air Basin (the Southern California pollution control agency) released a study on ambient concentrations of approximately 20 air toxics in the Los Angeles area. Based on that data and extrapolating to the whole nation, cancer incidence attributable to toxic air pollution may be as high as 500,000 fatal cases for those Americans now alive.

Cancer incidence for the general population is only one aspect of the problem. There is also an equity concern, the very high risk of health problems experienced by individuals living near large industrial facilities or in highly developed urban corridors. EPA has examined cancer risks at more than 2600 industrial facilities across the U.S. as part of its effort to promulgate air toxics regulations. At more than one-quarter of these facilities, toxic emissions produced cancer risks greater than 1-in-10,000 for people living nearest these plants (that is 1 additional cancer for each 10,000 persons exposed). If these sites were abandoned waste dumps, risks of that magnitude would qualify them for cleanup under the federal Superfund program.

Figure III-1



	Number of Point Sources in Risk Range*					
Pollutant	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	$<10^{-5}$
Acrylonitrile	0	0	3	10	8	5
Arsenic	0	0	6	17	28	33
Asbestos	0	0	5	26	28	270
Benzene	0	0	31	109	24	64
Butadiene	1	34	13	8	2	1
Cadmium	0	0	2	19	77	268
Carbon Tetrachloride	0	0	6	15	17	15
Chloroform	0	1	45	49	9	32
Chromium	0	0	2	9	14	394
Coke Ovens	0	13	25	5	0	0
Epichlorohydrin	0	0	0	0	0	19
Ethylene Dichloride	0	1	7	9	2	1
Ethylene Oxide	0	0	1	94	195	4
Methylene Chloride	0	0	7	40	114	17
Perchloroethylene	0	0	0	0	340	18
Trichloroethylene	0	0	0	0	4	38
Totals	1	49	159	410	853	1179
Cumulative percentage	0	2	8	23	56	100

Total number of sources assessed : 2651

* Less than one percent of the total number of point sources emiting these pollutants are shown. The majority of the point sources not shown would rank in the $<10^{-5}$ range.

The 1987 South Coast Air Basin study found cancer risks in the Los Angeles area for the mix of air pollutants from industrial sources, highway fuels and small business to exceed 1-in-1000. Based on the actual ambient concentrations recorded as part of the study, cancer deaths in the area were projected at 222 per year.

Beyond the cancer and other adverse health effects caused by exposure to air toxics, these air pollutants also cause widespread environmental degradation. It is estimated that a large percentage of the toxics in the Great Lakes—up to 80% of the toxics in Lake Superior—are deposited from the air rather than from surface runoff. Lakes all across the northern tier of states are now posted with warnings for pregnant women and children because of high mercury levels in fish attributable to mercury emissions from coal-fired powerplants.

Section 112 of the Clean Air Act adopted in 1970 requires EPA to list each hazardous air pollutant which is likely to cause an increase in death or serious illness. Within a year after listing EPA is to establish emissions standards which would apply to sources of the listed pollutant "providing an ample margin of safety to protect public health."

In the 18 years of administering section 112, EPA has listed only 8 pollutants: mercury, beryllium, asbestos, vinyl chloride, benezene, radionuclides, inorganic arsenic and coke oven emissions. No standard has been promulgated for coke oven emissions and for many of the other pollutants only a few of the source categories emitting the substance are actually regulated. For instance, mercury is a listed substance, but mercury emissions from powerplant boilers (exempt from standards) are contributing to high mercury levels in the flesh of fish taken in the Great Lakes region.

While EPA has listed only eight substances for regulation, a handful of States with active air toxics programs developed on their own have set standards for 708 substances. In 1983 and upon his return to EPA, William Ruckelshaus committed to make decisions within one year on approximately 25 toxic air pollutants that had been under review since 1977. Subsequently EPA decided that 14 of the substances did not require regulation, that 10 may be listed at some point in the future, and that 1 (coke oven emissions) was to be listed.

In 1985 EPA announced a new air toxics strategy shifting the focus from the regulation of hazardous air pollutants under section 112, to actions under other laws and by the States. The 1985 strategy elevated concern for emissions from the small, area sources like automobiles, dry cleaners, and small combustion units. One action announced in the strategy has been completed—a new source performance standard for wood stoves, but few of the other elements proposed have been implemented.

In 1987 the Court of Appeals for the District of Columbia reviewed decisions made by EPA with respect to vinyl chloride emissions. As with actions on other standards, EPA had considered cost in a decision to withdraw vinyl chloride standards that had been proposed during the later 1970s. The Court found that cost cannot be considered when establishing a safe level of exposure to toxic air pollutants. It is only in determining the margin of safety that EPA is authorized to consider cost and other factors. Because cost had been considered in several of the other hazardous air pollutant standards established by the Agency, five of the seven standards that had been issued may be reconsidered. The first proposed revisions for radionuclides were issued in the fall of 1989.

Recently, EPA began consideration of a new air toxics strategy that would again shift the focus of the program, this time from individual polllutants to source categories. The Agency has screened some 900 pollutants and 360 source categories to establish priorities for regulation, identifying 27 source categories as high-priorities for review. But the legal status of such a policy is in doubt, since the current law requires pollutants rather than source categories to be listed and also requires all sources of every listed pollutant to be controlled. Regulation of high priority source categories would necessarily trigger actions on other sources of lower priority hampering the efficiency of a program already short on resources.

Considering this record of false starts and failed opportunities, several conclusions are warranted:

I. Routine and episodic releases of hundreds of noncriteria air pollutants pose a significant threat to public health in the United States.

II. The risk of adverse health effects, principally excess cancers, from exposurse to toxic air pollutants is not distributed evenly across the population. Americans living within the vicinity of concentrated industrial activity or in heavily polluted urban areas may face relatively high risks.

III. Air toxics may also be causing significant environmental damage through deposition and run-off to surface waters, bioaccumulation in the food chain, or disruption of climatic or atmospheric processes.

IV. The Environmental Protection Agency has not made sufficient use of the existing authorities available under section 112 of the Clean Air Act to protect public health.

V. To some extent the statutory language itself may be responsible for the slow pace of the Nation's air toxics program as it requires emissions standards which provide an ample margin of safety to protect public health even for carcinogenic air pollutants where no level of exposure may be considered safe. If interpreted to require standards prohibiting emissions, regulations under section 112 would be potentially very costly for some source categories or pollutants.

VI. The regulatory time frames included in the existing law requiring the proposal of emissions standards within 180 days of listing a pollutant as hazardous and promulgation of standards 180 days later are unrealistic.

VII. A recent court decision nullified basic premises used by the Agency in the standard-setting process for hazardous air pollutants. Although listing and regulatory decisions had been scheduled for several other pollutants in the near-term, this decision is likely to cause additional significant delay as the Agency reassesses its basic policies.

VIII. Some measures proposed by the Agency in its 1985 air toxics strategy offer promise for addressing non-traditional sources of toxic air emissions. However, those proposals are not currently recognized within the structure of section 112 and have no other statutory authorization.

There is now a broad consensus that the program to regulate hazardous air pollutants under section 112 of the Clean Air Act should be restructured to provide EPA with authority to regulate industrial and area source categories of air pollution (rather than the pollutants) with technology-based standards in the near term.

In light of these conclusions, the reported legislation makes fundamental changes in the basic provisions of section 112 of the Clean Air Act. The bill establishes a list of 191 air pollutants and a mandatory schedule for issuing emissions standards for the major sources of these pollutants. The standards are to be based on the maximum reduction in emissions which can be achieved by application of best available control technology. These new, technology-based standards will become the principal focus of activity under section 112. Authority to issue health-based standards is preserved in modified form to be used for especially serious pollution problems.

This approach to regulation of toxic pollutants is not without precedent. It follows the general model which has been employed since the mid-1970's to control toxic effluents discharged to surface waters by major industrial point sources.

Under the 1972 amendments to the Clean Water Act, industrial dischargers were given two deadlines to control *conventional* pollutants (biological oxygen demand, suspended solids, and acidity): 1) by July 1, 1977 each facility was required to meet emissions limitations reflecting "best practicable control technology currently available" (so-called BPT limits); and 2) by July 1, 1983 each facility was to meet emissions limitations set according to "best available technology economically achievable" (BAT).

Toxic pollutants under the 1972 Act were to be treated differently. The Administrator was to publish a list of toxic pollutants within 90 days and within a year promulgate effluent standards that would provide an "ample margin of safety" to protect the most affected (aquatic) organisms. Thus, the structure of this authority to regulate toxic discharges to surface waters was very similar to the current structure of section 112 of the Clean Air Act.

During the five-year period following passage of the 1972 Clean Water Act, EPA promulgated standards for only six toxic pollutants. In 1975 the Environmental Defense Fund and the Natural Resources Defense Council brought suit against the Agency for failure to list more toxics and to promulgate standards as mandated by the Act. In June 1976, EPA and the plantiffs entered into a consent decree that established a new formula for the development of effluent standards for toxic water pollutants. This agreement created a list of 120 priority pollutants and required EPA to promulgate effluent guidelines based on best available control technology for each pollutant and each industrial category not later than December 31, 1980. Industrial dischargers were to be in compliance with these standards by July 1, 1983, the same deadline as established by the Act for BAT control of conventional pollutants. There were 14,000 dischargers divided into 21 industrial categories and 399 subcategories potentially subject to these new toxics standards.

When it amended the Clean Water Act in 1977, Congress incorporated the basic provisions of the consent decree into the statute. The 129 priority pollutants were listed by law. EPA was given authority to add to the list. Standards were to be promulgated by July 1, 1980 and enforced on and after July 1, 1984 giving industry time to install the necessary technology. Effluent limitations for toxics, as with conventional pollutants, were to be based on the reductions which could be achieved through application of the best available control technology, except that no discharge could contain a "toxic in toxic amounts."

The schedules for promulgation and implementation of the effluent standards ultimately proved too ambitious, but the program to control toxic effluents through emissions limitations based on the best available control technology for major industrial categories is now in place.

These technology-based effluent standards for 129 toxic water pollutants are similar in concept to the emissions standards for 191 toxic air pollutants which will be set according to the provisions of the revised section 112 of the Clean Air Act reported in this legislation.

Accidental releases.—On December 3, 1984, a pesticide manufacturing plant located in Bhopal, India experienced a catastrophic failure that released a cloud of the highly reactive and toxic chemical, methyl isocyanate, over the densely populated city. More than 3,400 died; 200,000 were injured. This tragedy, of unimaginable dimension until the day it happened, has riveted international attention on the problem of chemical accidents.

In August of the following year—and after countless assertions that "it can't happen here"—409 residents and chemical workers of Institute, West Virginia were sent to hospital emergency rooms by an accidental toxic release from Bhopal's sister facility (it also produced methyl isocyanate) located in that community. A follow-up inspection by the Occupational Safety and Health Administration at the Institute plant discovered 221 safety and health violations. OSHA proposed a fine of $1.38 million for what it described as "a willful disregard for health and safety."

Chemical accidents with serious effects have become commonplace in the United States. In response to Bhopal, the Environmental Protection Agency began several efforts to determine the scope of the chemical accident problem including compilation of an "Acute Hazardous Events Data Base" (AHE/DB) which was first published in December of 1985. In August of 1988 EPA prepared an update (which was released on April 8, 1989) covering 11,048 events in the United States involving the accidental release of extremely hazardous substances between 1982 and 1986. These events caused 309 deaths, 11,341 injuries and the evacuation of 464,677 people from homes and jobs. Evacuation information was only reported for about one-half of the recorded events, so the actual figure may be much higher.

Accidents were recorded in the data base for all 50 States, the District of Columbia, Puerto Rico and the Virgin Islands.

Seventy percent of the events occurred at stationary facilities; only 30 percent were transportation-related.

Four high-volume industrial chemicals (chlorine, ammonia, hydrochloric acid and sulfuric acid) were the source of injury or damage in 25 percent of the accidents. More than 200 additional substances were released during events that caused death and injury with industrial organic chemicals being responsible for the largest portion of the casualties. At least another 200 substances were released in events that did not produce injury or death.

Although the economic impacts of these chemical accidents are not consistently recorded, one source, documenting 64 accidents over a 28-year period, reports average damages of $30 million per event (in 1984 dollars) with one event resulting in more than $100 million in property damage.

As part of its work on the accident database, EPA analyzed 29 events with the highest potential for damage to health and the environment. These events were compared to the release at Bhopal, India which killed 3,000 and injured over 200,000. Considering only the toxicity and volume of the chemicals released in the 29 U.S. events, 17 of these events had the potential for more damage than Bhopal and all 29 had a potential of 50 percent or more of the Bhopal effects. That few were killed or injured in these accidents (650 people were injured in one event and 5 killed in another) is due principally to the location of the facilities and climate and operating conditions at the time of the release.

As a further illustration of the chemical accident problem from a State perspective, the State of New York has been making annual reports on the toll of chemical accidents. In 1986, New York experienced 672 toxic chemical releases, almost 2 per day. As the result of these events 5 people were killed and 133 injured. The Attorney General's office reports that more than 2,000 hazardous substances are used or stored at some 13,000 facilities across the State. Since 1983, the chemical accident toll is 26 killed, 378 injured and another 4,000 evacuated from their homes or workplaces as the result of chemical releases in that State alone.

In the aftermath of Bhopal, both the Occupational Safety and Health Administration and the Environmental Protection Agency have undertaken efforts to determine the nature and extent of the potential injury and damage which may result from the production and use of extremely hazardous substances. The OSHA program, called the Chemical Special Emphasis Program or ChemSEP, involved in-depth investigations at 40 plants including facilities from several industries and of several sizes. OSHA investigated the potential for releasing any one of just 10 chemicals at these 40 facilities. Despite this narrow scope, the average inspection took more than 340 hours (10 times the effort required for a typical health and safety inspection). Citations for unsafe conditions were made at 38 of the 40 plants; 128 of the citations were classified as in response to serious violations. Smaller and older facilities tended to have more violations.

The overwhelming impression one gains from a review of the OSHA ChemSEP report is that the safety and health regulations currently enforced by OSHA are not effective in reducing the risk of potentially catastrophic events. Quoting from the final ChemSEP report issued on March 11, 1987, OSHA says:

> The valuable lesson learned by OSHA from these ChemSEP inspections is that an inspection process different from the agency's traditional approach of determining compliance with safety and health standards is needed to address the identification and correction of potentially catastrophic situations. A comprehensive approach which includes both physical conditions and management systems is indicated . . . The combination of a low volume of safety and health standards citations with frequent use of the Occupational Safety and Health Act's General Duty Clause and frequent resort to recommendations in lieu of citations raises questions about how the orientation of existing OSHA standards might relate to the prevention of potential chemical catastrophes. OSHA's standards applicable to conditions found in chemical operations were developed to protect worker safety and health against common hazards, not rare catastrophic events. Re-evaluation of the role of existing standards and consideration of an approach to require industry to conduct self-audits seems to be indicated . . . OSHA's regular health inspections in the chemical industry have focused on chronic exposures to hazardous substances. While this concern is sometimes appropriate, it is not germane to the problem of preventing catastrophic releases.

In June 1985, the Environmental Protection Agency announced a comprehensive air toxics strategy. One section of that strategy, the Chemical Emergency Preparedness Program (CEPP), was designed to address accidental releases of acutely toxic chemicals. The program had two goals: (1) to increase local community awareness of chemical hazards; and (2) to enhance State and local emergency planning for response to chemical accidents. By November of 1985, EPA had developed criteria for identifying acutely toxic chemicals and a list of 402 such substances. The list was published along with a guidance document on organizing community-based emergency preparedness programs. The general structure of CEPP and the list of acutely toxic chemicals were incorporated by the Congress in the Emergency Planning and Community Right-to-Know Act which was signed into law (as Title III of the Superfund Amendments and Reauthorization Act (SARA)) in October of 1986.

The Emergency Planning and Community Right-to-Know Act has four major objectives: (1) emergency planning; (2) emergency notification; (3) community right-to-know; and (4) the development of an emissions inventory. In addition, The Emergency Planning and Community Right-to-Know Act contains general provisions on trade secrets and enforcement.

The Emergency Planning and Community Right-to-Know Act requires the Governor of each State to designate a State emergency planning commission. The State commissions include the public safety and environmental protection agencies of State government and other parties. The State commissions are to designate local emergency planning districts and appoint local emergency planning committees. The State commissions also have a role in reviewing local emergency response plans once they are developed.

The local emergency response committees are broadly representative of the public safety and environmental protection interests found in every community: elected officials; police, fire and civil defense authorities; public health professionals; environmental and transportation officials; community groups; and the media. The principal duty of these local committees is to develop an emergency response plan for the planning district.

Each facility handling one of the extremely hazardous substances listed pursuant to The Emergency Planning and Community Right-to-Know Act must notify the local emergency planning committee and designate an officer or employee of the facility to work with the committee in preparation of the plan.

Each local planning district has developed an emergency response plan. These plans are to include: 1) identification of facilities handling and routes used in the transportation of extremely hazardous substances; 2) emergency response procedures at these facilities and in the community; 3) designation of community coordinator and a facility coordinator to implement the plan; 4) emergency notification procedures; 5) methods for detecting the occurrence of a release and the potentially affected area and population; 6) description of community and industrial emergency equipment and facilities; 7) evacuation plans; 8) schedules of training programs; and 9) methods for carrying out emergency response plans.

In addition to its implementation of the Emergency Planning and Community Right-to-Know Act, EPA is also conducting a program to gather data on the cause of chemical accidents. The Accident Release Information Program (ARIP) is conducted by sending questionnaires to facilities which experience large or frequent chemical spills which must be reported under the Superfund law. Data on chemical accidents gathered by the 330 ARIP surveys that have been made is contained in Exhibits 1 through 6 of Figure III-2.

PILOT ARIP RESULTS

Exhibit 1
MOST FREQUENTLY RELEASED CHEMICALS

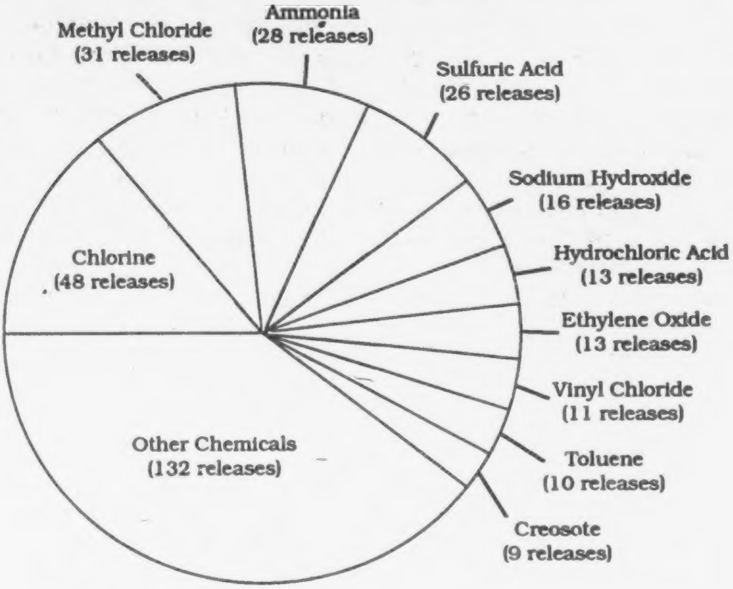


Exhibit 2
INDUSTRIES MOST FREQUENTLY INVOLVED IN ACCIDENTAL RELEASES

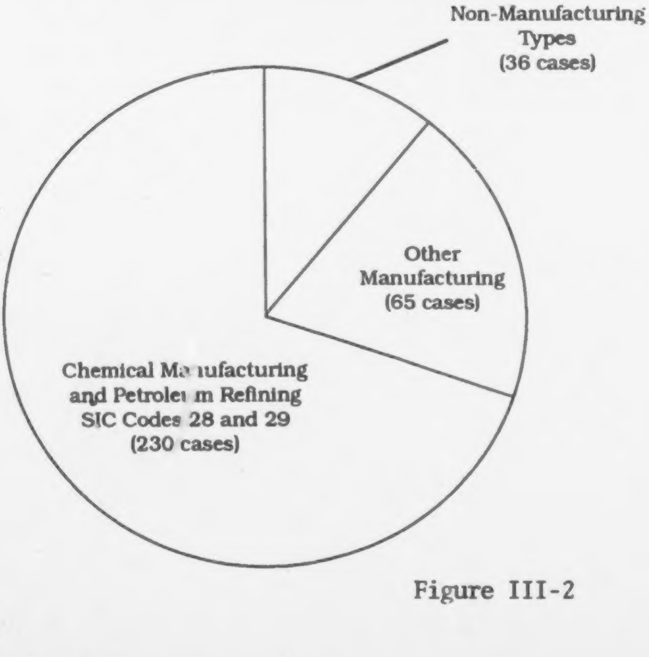
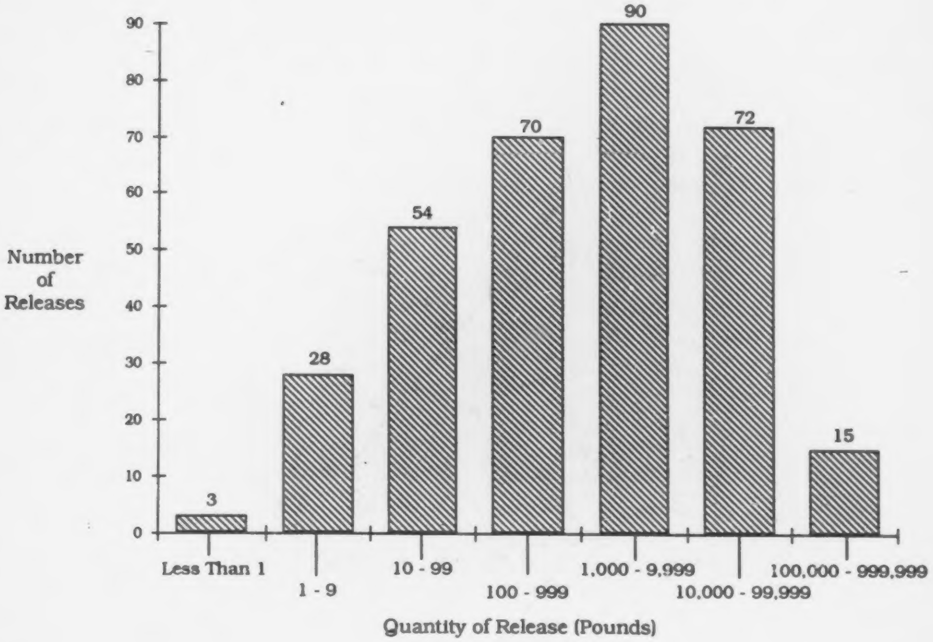


Figure III-2

Figure III-2 (Continued)

PILOT ARIP RESULTS

Exhibit 3
QUANTITIES OF CHEMICALS RELEASED



Note: Quantities were not given for five releases.

Figure III-2 (Continued)

PILOT ARIP RESULTS

Exhibit 4

MOST COMMON CAUSES OF RELEASES

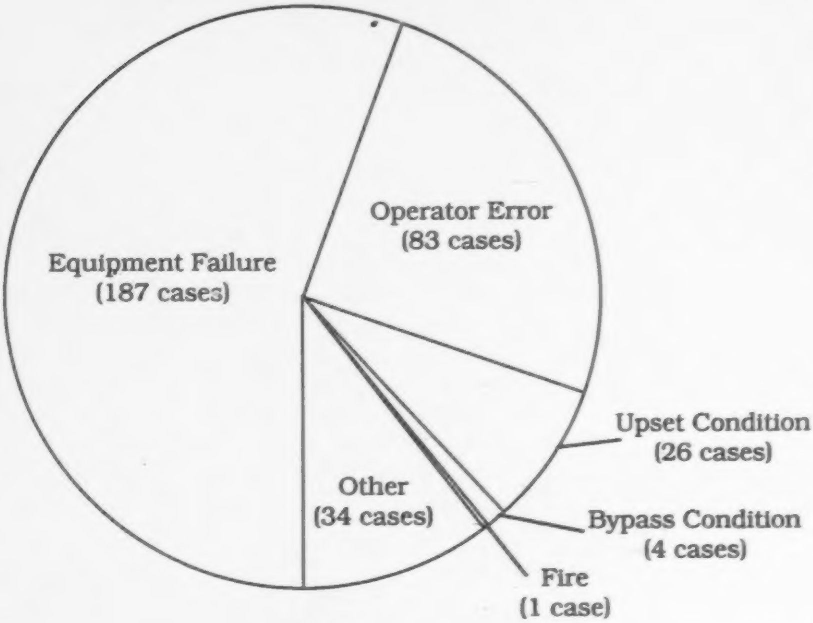


Exhibit 5

IN-PLANT LOCATION OF RELEASES

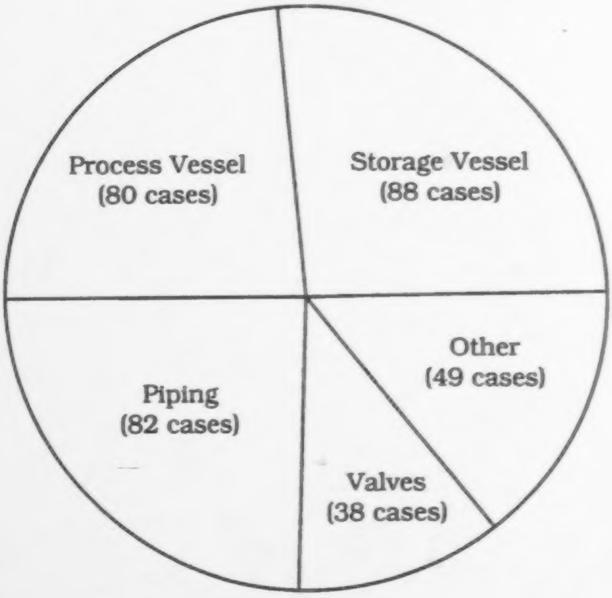
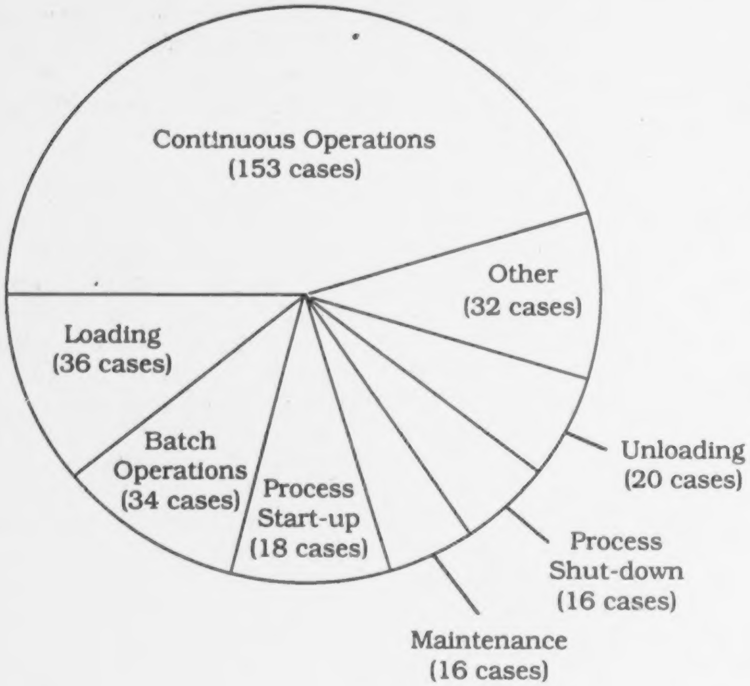


Figure III-2 (Continued)

PILOT ARIP RESULTS

Exhibit 6

PROCESS STATUS WHEN RELEASES OCCUR



A few States, most prominently New Jersey and California, have taken a more aggressive posture. Perhaps the most innovative and promising response worldwide to the chemical accident problem is the Toxic Catastrophe Prevention Act (TCPA) which became law in New Jersey in January of 1986. TCPA applies to each New Jersey facility which handles any one of 104 extremely hazardous substances in more than threshold amounts. Each such facility must complete a registration form which includes an inventory of all extremely hazardous substances present at the site; a description of the processes and equipment at the facility; a profile of the area and community in which the facility is located; a description of the formal hazard assessments which have been conducted; and the names of the facility's insurance carriers.

A risk management program is to be developed for each facility. These programs include safety reviews of process design and equipment; standard operating procedures; preventive maintenance; operator training; accident investigation; risk assessment; emergency response plans; and audits to assure that plans and requirements are being implemented. Facilities having a risk management program are to submit them for review and proposed modification by the New Jersey Department of Environmental Protection.

Facilities without existing risk management programs are to conduct a formal hazard assessment. Based on the assessment, DEP and the owner or operator of the facility will jointly develop a risk reduction work plan. TCPA gives the State agency the power to issue orders requiring implementation of the work plan and steps to reduce the risk of catastrophic releases on a plant-by-plant basis.

The State of California has also adopted a chemical accident prevention statute (AB 3777). Each business handling an acutely hazardous material (the list of substances prepared by EPA under CEPP) must file a registration form and submit an inventory of substances on site. The locality in which the business operates may request preparation of a "risk management prevention plan" which will include: a description of any accidental release occurring over the past 3 years; a report on the equipment at the site, its condition and maintenance; an analysis of potential off-site consequences of a release; a description of steps that will be taken to reduce risk; the installation of alarms and monitoring devices; and audit, inspection and record-keeping programs. The "risk management prevention plan" must be submitted to the local government for approval. The local government has the right to enter and inspect the facility and may require that all of the necessary risk reduction measures (including modifications to equipment and operations) be taken before operations at the facility commence.

New Jersey and California are not alone in taking steps to reduce the risk of serious chemical accidents. As the result of events in Flixborough, England in 1974 (an explosion which killed 29) and Seveso, Italy in 1976 (a non-fatal accident which nevertheless contaminated several square miles of the Italian countryside with dioxin), the European Community adopted the so-called "Seveso" Directive in 1982. Its basic features include:

(1) a general duty placed on member nations to adopt regulations to ensure that industrial firms take measures to prevent

major accidents and to limit their environmental and public health consequences;

(2) a general duty placed on chemical companies to prove to appropriate government officials that they have identified major hazards, adopted appropriate safety measures, and provided employees with information, training and equipment needed to ensure that safety;

(3) a requirement that companies notify government authorities, if their activity involves any of a list of 178 dangerous substances, including information on the substances, the facilities, and possible major accident hazards, and on-site emergency plants;

(4) a requirement that member nations appoint authorities to receive and examine the information from the companies, and draw up off-site emergency plans;

(5) a requirement that industrial firms take the most appropriate measures to prevent accidents, to limit their consequences, and to conduct inspections;

(6) a requirement that governments make available to persons likely to be affected by an accident information on safety measures and on emergency response measures, and make the same information available to other governments;

(7) a requirement that a company experiencing a major accident notify the authorities and provide information on the accident (after which the government must notify the European Community for dissemination of information on the accident and any potential hazard to other nations); and

(8) trade secret protection for confidential information.

Based on the above review of the record with respect to chemical accidents and the measures that various Federal agencies, States and other nations are taking to respond to chemical accidents, several conclusions are warranted:

I. Sudden, catastrophic events that result in the release of extremely hazardous substances are a significant (and perhaps, increasing) threat to public health and safety in the United States.

II. The United States Government (acting through EPA and OSHA) is currently supporting some efforts in the areas of local emergency planning and community right-to-know which are useful and may provide a modest information base for further action to reduce the potential for catastrophic events.

III. Emergency planning and preparedness is an essential aspect of a total response to this threat. Accident prevention has great promise, but is not given sufficient attention in current Federal programs.

IV. Some European nations and American States have developed innovative and aggressive accident prevention and risk reduction programs that could serve as models for new, national efforts.

V. Given the technical complexity and economic importance of modern industrial chemical utilization, it is appropriate that Federal agencies play a leading role in accident prevention and mitigation. However, no agency of the United States Government is actively engaged in efforts to prevent chemical accidents, today.

VI. Additional steps beyond emergency planning and community right-to-know are now appropriate and, if implemented with existing programs in a coordinated manner, may offer significant enhancement of public health and safety at minimal national cost.

Based on these conclusions the reported legislation adds a new section 129 to the Clean Air Act which will:

(1) establish a short list of extremely hazardous substances for priority attention;

(2) require each facility handling such substances to prepare a hazard assessment;

(3) create an independent Chemical Safety Board to investigate accidents and recommend measures to reduce the risk of catastrophic events;

(4) authorize the Environmental Protection Agency to issue rules to prevent, detect and correct accidental releases of extremely hazardous substances;

(5) authorize the Agency to issue orders to correct site-specific situations which may endanger public health or the environment through release of an extremely hazardous substance; and

(6) establish accident prevention and mitigation as a general study of those who own and operate facilities handling extremely hazardous substances.

Municipal Waste Combustion.—In addition to new authorities to control emissions of hazardous air pollutants and to prevent catastrophic chemical accidents, title III also provides for the control of air emissions and management of ash disposal from municipal waste incineration units.

Incinerators have come to the forefront in the solid waste disposal industry because the quantity of the waste generated continues to increase while landfill disposal capacity declines.

Currently Americans generate about 160 million tons of solid waste per year. At the same time that waste volume is increasing, landfill capacity is declining for a variety of reasons. Many landfills are simply reaching thier capacity. Some landfills are being closed because of increasing understanding of the damage they do especially to ground water and other environmental resources. It is hard to site a new landfill even in remote rural areas, so existing capacity is not being replaced as it is used up. Finally, environmental controls that are being incorporated to address some of the concerns have so increased the cost of landfilling (up to $25 to $150 per ton in some places) as to make garbage disposal costs the largest budget item for some local governments.

For many cities, incinceration is a partial answer to the land disposal crisis. It reduces the volume of the waste by 70 to 90 percent. Much less capacity is needed in a solid waste management system that includes incineration. Incineration is part of a larger hierarchy which is necessary to solve the solid waste program. There are four elements in an effective strategy to resolve the solid waste crisis.

First, source reduction includes steps to minimize the waste generated and to generate only wastes that can be appropriately handled in a solid wage program. One significant factor in the rapidly increasing generation of solid waste is packaging. To prevent theft, merchandise is now packaged in large containers. Packaging is also a sophisticated part of the marketing plan for many products. The result is more solid waste. Lead and cadminum are good examples of the toxic constituents that might be eliminated or reduced. They are used extensively in printing inks and cadmium is used as a stabilizer in plastics. They are both extremely toxic substances which cannot be destroyed by incineration and which leach easily from ash or solid waste in a landfill environment. The Swedish government has recently acted to ban cadmium from commercial products in that nation. There is, however, no comparable waste reduction effort in the United States.

Second, source separation and recycling can recover and reuse many of the materials in the solid waste stream which are not combustible and would have more value if handled separately. These include glass, aluminum and ferrous metals. In addition there are markets for some of the combustibles like paper. Some consumer products, like batteries, are especially troublesome when incinerated and could be recycled through the original retail outlets. Finally, combustibles like lawn clippings can be composed or handled in other ways which are not environmentally damaging and which are less capital intensive than incineration or landfilling. Currently, Americans recycle approximately 10 percent of their solid waste. Some U.S. communities do much better and many innovative programs have been developed in recent years to respond to the crisis.

Third, municipal waste combustion not only reduces volume, but energy is also generated at most of the modern plants. Incinerators now take about 8 percent of the waste stream and may increase to 20 percent of the total by the year 2000.

Finally, landfilling is necessary even when a community has a good recycling and incinerator program. Currently, landfills are the initial recipient of 85 percent of the solid waste generated.

Federal law has played a role in making incincerators much more attractive solid waste options. Under the Public Utilities Regulatory Policy Act adopted in 1978 power companies are required to buy power from cogenerators at "avoided" cost—the price of a new powerplant. This has made a market for the energy that can be generated by incinerators and the electricity revenues are an important factor in accelerating the economics for these plants.

There are three types of incinerator technology. First, "mass burn" units are the facilities which take garbage untreated and burn it in a simple process to produce heat, steam and electricity. These facilities are large, and constructed on-site and are the dominant technology both now and in the future. They include 68 percent of the MWC capacity.

RDF is the acronym for "refuse-derived fuel." RDF involves centralized separation and treatment of the solid waste before it is burned. The waste is processed to remove non-combustibles and is shredded or pelletized so that it can be fed to specialized boilers. Some RDF is co-fired with coal at electric powerplants, but most is burned at 100 percent RDF-dedicated boilers. They comprise 23 percent of the MWC capacity.

"Modular" is the name of the third technology. These are usually small, pre-fabricated units which burn the waste in a two-chamber process. They are only 9 percent of the capacity because each plant is relatively small.

At a mass burn plant a truck hauling waste generally pulls into a covered area which is called the tipping floor. The waste load is dumped into a pit which generally has a capacity somewhat greater than the daily loading rate for the combustion unit (so waste can be stored during upsets). The waste is lifted from the pit by a crane and loaded onto a moving grate which carries it through the combustion unit. The key factors in good combustion are high temperature (1800 degrees), the time the waste is held at that temperature (one second) and turbulence (through mixing of the air so that all combustibles are burned). The unburnt ash falls through the grate into a second pit where it is cooled before transportation to a landfill.

The sides of the boiler in which the waste is combusted incorporate tubes for water circulation and steam generation. The steam is carried to a turbine which produces electricity.

The flue gas generated from the combustion might be treated in several ways. Some facilities now have electrostatic precipitators (ESPs) which remove particulate matter in one or more charged fields. A few facilities have acid gas scrubbers which generally work by introducing an agent into the flue gas which will react to neutralize the acids. Some facilities with scrubbers use a baghouse to remove the particulates as an alternative to ESP. These baghouses contain fabric filters which remove the fly ash. One facility in California then passes the flue gas through a catalytic converter (called selective catalytic reduction or SCR) to remove the oxides of nitrogen. The fly ash which is produced by the emission control systems may or may not be mixed with the bottom ash. But both are ultimately disposed in landfills.

The air pollutants which are of concern at incinerators can be grouped into the following subsets:

Particulates.—This is ash, dust and smoke in the flue gas. It causes visibility problems. It can also carry metals and organic compounds which are not completely combusted.

Metals.—The metals in flue gas may include lead, cadmium, arsenic, beryllium, zinc, chromium, nickel, antimony, and mercury. The metals come from inks, plastics, batteries, appliances and other sources. They are not destroyed by combustion. They may be vaporized which makes them more difficult to remove with pollution control devices. The may also be transformed into a new chemical matrix making them more available for leaching and human uptake.

Acid Gases.—Although sulfur dioxide is a pollutant produced by incinerators, the emissions rate is small by comparison to coal-fired powerplants. Another acid gas of concern is hydrochloric acid (HCl). There is more chlorine in municipal waste than in other sources of fuel and incinerators can be the source of HCl emissions causing materials damage in neighborhoods near an incinerator.

Organics.—The principal organic pollutants of concern are dioxins and furans because of their potency as toxics. Almost all of the cancer risk from incinerators is attributable to these two substances. It was originally thought that they were produced by combusting plastics. But it now appears that they are formed from a variety of feedstocks, but that formation can be prevented by very high combustion temperatures.

Oxides or Nitrogen.—Very high combustion temperatures, however, contribute to the generation of nitrogen oxides. Nitrogen dioxide is a criteria air pollutant and NO_x, generally, is a precursor of ozone and acid rain.

Carbon Monoxide.—CO is also a criteria air pollutant. Carbon monoxide is produced when the combustion process is incomplete.

Municipal waste combustion provisions which are included in the bill are based on the following conclusions:

I. The nation is experiencing a solid waste disposal crisis. If not in every community, a substantial number of the nation's towns, cities and counties are struggling with waste disposal problems never before seen.

II. There is a four-part hierarchy for managing solid waste which begins with waste reduction, goes on to recycling and treatment and concludes with disposal of remaining residues in secure landfill facilities.

III. Cities and counties have already made a considerable financial investment in the more than 100 municipal incineration units already operating. Including plants in construction or on the drawing boards, more than $17 billion in capital investment has been committed to the incinerator option.

IV. Municipal waste incineration units are major sources of criteria air pollutants and present, if uncontrolled, a substantial threat from toxic emissions including heavy metals and dioxins and furans.

V. Air emissions standards based on best available control technology and clear requirements for ash disposal which are adequate to protect human health and the environment should be promulgated by the Federal Government at an early date.

HAZARDOUS AIR POLLUTANTS (SECTION 301)

SUMMARY

Section 301 amends section 112 of the Clean Air Act which authorizes the promulgation of emissions standards applicable to sources of hazardous air pollutants.

The bill establishes an initial list of 191 hazardous air pollutants. The substances on the list in the reported bill are precisely the same substance which were recommended by the President and the Administrator of the Environmental Protection Agency in the Administration's bill. The Committee has made no deletions or additions.

The Administrator is given authority to modify the list by adding or deleting substances.

Any stationary source emitting more than 10 tons per year of any one of the listed hazardous air pollutants or 25 tons per year of any combination is defined as a "major source" and is to comply with technology-based emissions standards established under the amended provisions of section 112.

In addition to the list of pollutants, EPA is to establish a list of source categories for the purpose of promulgating standards. The emissions limitations will apply to sources in a category (refineries, smelters, boilers, incinerators, chemical plants, wastewater treatment facilities, coke ovens, etc.) rather than to pollutants individually. There may be 200–250 categories of major sources.

For each category of sources, EPA will promulgate an emissions limitation based on installation of the maximum achievable control technology (MACT) for sources in the category. MACT standards generally reflect best available technology and can take cost into account. In setting MACT standards, EPA is to give priority to pollution prevention measures like process changes and materials substitution.

MACT standards for all source categories are to be promulgated within 10 years of enactment of the legislation, with the first set of standards for some sources of organic solvents, heavy metals and coke oven emissions to be issued within 2 years. Existing sources must comply with MACT standards not later than three years after promulgation. New sources must comply immediately.

Any source which makes a voluntary reduction (below a 1985 or later base year) of 90 percent in its emission of hazardous air pollutants (95 percent for particulates) before December 31, 1992 shall be granted an exemption from the MACT standards which would otherwise apply to that source.

It may be that the MACT technology-based standards will not reduce emissions sufficiently to remove all risks of concern to health and the environment which result from emissions of hazardous air pollutants from sources in the category. The MACT standards are based on the performance of technology, and not on the health and environmental effects of the hazardous air pollutants. If a significant threat to public health or the environment remains after technology standards are implemented by a source category, EPA is to tighten the emission limitation for that category not later than five years after the initial standard is promulgated. This second phase of standards has come to be called "residual risk" because it is designed to eliminate the residual risks of concern which continue even after application of MACT standards.

For carcinogens, EPA is to promulgate two residual risk standards. One standard is to be set at a level which would reduce risks to less than 1-in-1,000,000 for the most exposed individual (that is—less than 1 excess cancer for each 1,000,000 persons exposed to emissions from a source in the category at maximum levels over a 70-year period). Sources in the category may receive repeated case-by-case exceptions from this standard, if they can show that it is not achievable using known pollution control technology. The second standard is to eliminate all lifetime cancer risk greater than 1-in-10,000. It is a less stringent standard. Sources may be granted a one-time, five-year extension (in addition to the three-year compliance period) to meet this standard, but compliance is required at the end of the five-year extension or the source must shutdown.

The Administrator is also to promulgate a second round of standards for hazardous air pollutants other than carcinogens where MACT standards do not reduce emissions to a level below the "safe" threshold (the "no observable effects level" with an ample margin of safety), if a threshold can be identified for the pollutant and the health effect.

Each source subject to a standard under the revised section 112 is to operate in compliance with a permit. Permits are to have a term not exceeding five years. Permittees are to pay fees sufficient to offset all of the direct and indirect costs of operating State programs developed to regulate point source emissions of hazardous air pollutants. Permits will require continuous emissions monitoring unless it is not feasible and will require facility operators to report monitoring results including any violations of the standard.

In the event that the Administrator fails to promulgate a standard according to the schedule required in the bill (which has happened frequently under existing law), each source which would have been subject to the standard is to apply for a permit which contains an enforceable emissions limitation reflecting the level of control which is the best available as determined on a case-by-case basis by an independent engineer.

The legislation significantly expands the statutory role for State and local air pollution control agencies in the regulation of air toxics. These agencies have often taken the initiative to fill the void left by Federal inaction and several States already have or are in the process of creating aggressive air toxics programs. The bill would authorize State and local pollution control agencies to submit proposed programs, to implement and enforce emissions standards for hazardous air pollutants established by the Agency and to participate in programs to prevent and mitigate the accidental releases of extremely hazardous substances.

The Administrator is to provide guidance to the States on the elements to be included in proposed programs. At a minimum the programs must: (1) include permit requirements for all sources within the State subject to standards issued under section 112; and (2) provide for the registration of all facilities handling extremely hazardous substances listed pursuant to section 129 in more than threshold amounts. State programs may also include provisions for the review of point sources of air toxic emissions which present especially significant risks to those residing or working within the vicinity of the source.

Programs developed and proposed by the States are to be reviewed by the Administrator and are to be approved or disapproved based on statutory criteria. Programs disapproved may be resubmitted after modification to take account of the concerns expressed by the Administrator. After a program is approved, the Administrator shall withdraw approval, if the State fails to carry out the program as required and does not take corrective action within 90 days of notification of such failures by the Agency.

The national air toxics clearinghouse already established and operated by the Agency is explicitly authorized.

In addition to this program for major sources of hazardous air pollutants, the bill also includes provisions to reduce the health and environmental threats posed by emissions from "area" sources.

Although the risk from each area source may be small, studies indicate that they may account for as much as 75 percent of the cancer cases attributable to air toxics in some urban areas.

The legislation contains an integrated program to reduce risks from area sources of the same 191 listed hazardous air pollutants. In addition to listing major sources for MACT standards, the Administrator shall also list area sources for technology-based standards where the Administrator it is warranted. The Administrator may require area sources to install MACT, but also has the option to impose less stringent emissions limitations reflecting generally available control technology.

As a second element addressing the are a source aspect of the problem, the Administrator is to prepare a national urban air toxics strategy to reduce risks from area sources. The objective is to reduce cancer risks attributable to the emission of hazardous air pollutants from area sources by 75 percent as recommended by the President in June of 1989 in his statement announcing the Administration's proposed clean air legislation.

As part of the national urban air toxics program, EPA is to monitor for a broad range of hazardous air pollutants in several urban areas to better identify the area source problem. All cities with populations over 250,000 are to monitor for air toxics which the Administrator determines present the greatest risk to public health in metropolitan areas. Not later than five years after enactment of the legislation and based on information gathered through the mandated monitoring programs, EPA is to propose a national urban air toxics strategy that will significantly reduce risks from area sources located in urban areas. The strategy is to be implemented using authorities available to the Administrator under the Clean Air Act and a variety of other statutes and EPA is to report on implementation at eight and ten year intervals after enactment of the bill.

The bill also provides for the establishment of a toxics deposition monitoring network in the Great Lakes watershed and for coastal waters.

Standards issued under section 112 as in effect before enactment of the proposed bill are to stay in place until they require revision as determined by the Administrator. Revised standards for source categories already regulated are to be promulgated pursuant to the authorities established by these amendments, except for several source categories emitting radionuclides which will continue to be regulated under the provisions of section 112 as currently written.

DISCUSSION

Definitions.—Under provisions of the bill, "major sources" of hazardous air pollutants will be subject to emissions standards developed by the Administrator which reflect the degree of control that can be accomplished through application of the maximum achievable control technology. The concept of "major source" is not used in the current regulatory regime for hazardous air pollutants and, thus, a definition of "major source" neds to be added to section 112. The definition established here will only apply in the context of this section and should not be confused with other meanings of the term "major source" in parts C (prevention of significant deterioration) or D (non-attainment) of the Act.

Major sources are stationary sources of the hazardous air pollutants listed pursuant to the new subsection (b) which meet either one of two tests. If the source emits 10 tons or more per year of any one of the listed hazardous air pollutants, it is a major source. A facility will also be considered a major source, if it emits any combination of the pollutants on the list in an amount equal to or exceeding 25 tons per year.

The Administrator may establish quantities less than 10 tons per year for one pollutant or 25 tons per year for any combination, if the toxicity (potency) of the pollutant or pollutants or other noneconomic factors (human exposure, concentration of sources additive or synergistic effects, environmental damage or other factors) indicates that a lower threshold is appropriate. The authority to set lower thresholds as part of the "major" definition may be especially useful in the control of particulate emissions including metals for some source categories.

The definition of "major source" also includes provisions to assure that stationary sources which would otherwise be subject to the emissions standards, are not excluded from control requirements as the result of arbitrary subdivision or description of the source. A stationary source potentially subject to an emissions standard because it emits a listed air pollutant is to be defined to include "all emission points and units of such source located within a contiguous area and under common control". This language will prevent a facility from avoiding control by subdividing its operations into separate emissions points, product lines or units at one site with individual emissions rates less than the 10 or 25 ton per year thresholds.

The determination as to whether a source is a major source as defined in section 112(a)(1) is based on the emissions of hazardous air pollutants from the source after application of installed controls and reflecting the actual operating conditions of the particular source. Operating conditions which affect the rate of emissions include intermittent emissions from sources which employ batch rather than continuous manufacturing methods. If the operating conditions at a source subsequently change (*e.g.*, the batches per year change in number or size) with the result that the source exceeds the specified thresholds, the source would then become a major source and subject to the standards of section 112.

The revised section 112(a) also includes a new definition for the term "area source". Area sources are the small, diverse facilities and activities which routinely release toxic air pollutants and may include sources like wood stoves, service stations, dry cleaners, and automobiles, trucks, and buses. The bill directs the Administrator to establish a national urban air toxics strategy to reduce cancer risks attributable to emissions from such sources by 75 percent over a nine-year period. An area source may be either a stationary source or a mobile source of one or more of the 191 pollutants listed pursuant to section 112(b) (or other pollutant subsequently added to the list).

Area sources will also include facilities of a type or types which are included among the major sources. Although of the same kind, these facilities are sources rather than major sources because their emissions fall below the levels necessary to be classified as a major source. For instance, industrial dry cleaning operations will be listed as a major source category because some of these operations emit the solvent perchloroethylene, which is one of the 191 listed substances, in amounts greater than 10 tons per year. Small dry cleaners emitting lesser amounts of perchloroethylene would be among the area sources as defined in the bill. In the same way, small chemical processing or handling facilities, petroleum facilities and other stationary sources are defined as area sources even though other facilities of the same kind reach major source status. All sources of the listed pollutants shall be classified either as major or area sources.

The inclusion of mobile sources under the definition of areas sources, and the possible delegation of section 112 implementation and enforcement authorities to State and local pollution control agencies under section 112(1) does not in any way authorize the regulation of mobile source emissions by State or local agencies, if that regulation would be prohibited by other provisions of the Act.

New section 112(a)(4) defines a "new source" as a source which commences construction or reconstruction after the date on which EPA proposes emissions standards under this section applicable to that source. This definition is important for several reasons. Under section 112(d) EPA is authorized to distinguish between new and existing sources in establishing emissions standards based on the maximum achievable control technology (MACT). Section 112(i) provides that new sources must meet emission standards based on MACT or standards developed under subsections (f) or (g) to reduce residual risks before beginning operations, while existing sources may have up to three years to comply. The special extension for meeting an emissions standard reducing the maximum individual risk of cancer to not greater than 1-in-10,000 and the temporary exceptions from an emissions standard reducing the maximum individual risk to no greater than 1-in-1,000,000 are only available for existing sources; all new sources must meet the 1-in-1,000,000 standard from the date of its promulgation.

The definition of "new source" in section 112(a)(4) is different than the definition for this term in section 111, part C or part D. Those provisions include as "new" sources which commence construction or *modification* after the date on which emissions standards are proposed. The term "modification" is further defined as a physical change, or change in the method of operation, which has significant emission consequences. The definition of "new source" in section 112(a)(4) does not include modifications and is not emission-related. It does not require increases in emissions or changes in the operation of previously existing facilities to be triggered. Since there is no threshold of emissions increase, it is not possible for an existing source adding new facilities to avoid being considered new by "netting out", or reducing its overall emissions so that the increase is below some threshold of significance.

The test of section 112(a)(4) as to whether a source is commencing construction or reconstruction is physical and economic, rather than emissions-related. In determining what constitutes "reconstruction", it is helpful to consider some examples. Reconstruction is a major physical change in the facility so as to virtually replace it or to substantially augment its capacity. (Such augmentation may be considered either construction or reconstruction, if done in connection with an existing facility.) Repowering of boilers, or similar changes made to facilities emitting other pollutants, which have the effect of expanding useful life of the facility while restoring or adding capacity, would constitute reconstruction. In the Wisconsin Electric Power Company case involving the repowering of utility boilers, EPA determined that such a major change in the unit, even though not resulting in a significant increase in emissions, qualified the repowered unit as a new source subject to the new source performance standards under section 111. This is an appropriate interpretation of section 111 of current law, and it is also a good example of the meaning of the phrase "construction or reconstruction" in the definition of new source added to section 112(a) by this legislation.

In addition to the concept of a physical change replacing or augmenting the capacity of a source, EPA may also establish an economic test by which a program of physical changes at a source may also qualify as reconstruction.

Amendments to section 112(a) made by the bill also adopt a definition of "stationary source" different than used in current law. A stationary source is defined to include any particular unit of a facility or installation (with the capacity to emit 10 tons of a listed pollutant per year) in addition to the facility or installation itself. This definition is intended to prevent "bubbling" within facilities and installations which might otherwise be used to satisfy emissions standards which may be promulgated for some, but not all units, of a facility or installation under section 112. To the extent that an emissions standard is established under subsections (d), (f) or (g) for a unit at a facility or installation which may also emit the pollutant from other units or parts of the operation not subject to a standard (or subject to a different standard), emissions reductions at the uncontrolled (or otherwise controlled) unit shall not be considered in determining compliance with the standard or standards.

"Adverse environmental effects" are defined broadly to mean any significant threat of adverse effects to any of the full range of environmental values encompassed by the current definition of "welfare" in Section 302 of the Act, including, but not limited to, effects on wildlife, aquatic life, or other natural resources. The term encompasses any disruption of local or regional-scale ecosystems, effects on populations of endangered or threatened species, degradation of environmental quality over broad areas, or other comparable effects.

Under this definition, the Administrator is required to consider not just the direct effects of airborne concentrations of a pollutant, but also the effects from its cumulative deposition on land or in water bodies, and its uptake in plant or animal species. In particular, the Administrator must consider the adverse effects of the bioaccumulation and biomagnification of pollutants in plants or animals that take up the pollutants from the environment, and the further concentration of the pollutant in the tissues of animals farther up the food chain. The duty to consider deposition and bioaccumulation is specifically stated in the provisions governing the Administrator's listing of additional hazardous air pollutants.

Powerful evidence of adverse environmental effects due to toxic air pollutant has been accumulated specifically with reference to the Great Lakes region. The Great Lakes and other smaller lakes are heavily contaminated with a variety of persistent organic chemicals and heavy metals. With improvements in the control of surface water pollution, it is now the case that the primary route through which these toxic substances reach these water bodies is air pollution. According to the International Joint Commission and other authorities, more than 90 percent of three of the most serious toxic pollutants entering Lake Superior—PCBs, lead, and benzo(a)pyrene (all of which are listed by this legislation)—are coming from the air. For Lakes Michigan and Huron, the figure is 50 percent or more. In particular, International Joint Commission data estimate that 543,000 kilograms of lead enter Lake Michigan each year, 99.5 percent from the air.

Airborne toxic fallout contaminates even isolated lakes that have no nearby industrial sources and no other route by which pollutants could reach them. The pollution is capable of travelling on the wind from sources hundreds, even thousands, of miles away. The case of Lake Siskwit, sitting on a wilderness island (Isle Royale) that lies in the far reaches of Lake Superior, is perhaps the best known. Toxaphene, a (now-banned) pesticide used no closer than the cotton-growing areas of the deep South, has been found in this lake along with concentrations of PCPs, hexachlorobenzene, and other persistent toxic organics.

Mercury has been found in snow samples in Northern Minnesota at concentrations exceeding EPA water quality criteria. Last January, Michigan issued fish advisories warning of mercury contamination for all of its inland lakes and cited atmospheric deposition as a major source of the contamination. Every Great Lakes State and the Province of Ontario has issued fish advisories for a variety of toxic chemicals. Some of the advisories even cover consumption of ducks and other waterfowl species hunted in the Great Lakes region.

Many of the pollutants of greatest concern bioaccumulate in fish and organisms higher up the food chain. To illustrate the extent to which contaminant concentrations can be magnified, consumption of a single one-pound serving of fish contaminated with PCBs at five parts per million delivers as much PCBs as one would ingest by drinking Great Lakes water for 1000 years. Once ingested, PCBs and other toxic chemicals can be passed across the placenta and in breast milk to fetuses and nursing infants.

Adverse effects on humans from consumption of contaminated food are, of course, health effects as well as environmental effects. As such, the Administrator has the responsibility to assure human health protection from these effects when establishing residual risk standards, and at other health-related decision points under this legislation. The examples of human health effects, however, illustrate how nonhuman life which is also relatively high on the food chain can be adversely affected. Scientific studies have shown high incidences of cancer among fish species and reproductive and developmental disorders among waterfowl (e.g., cross-billed syndrome, egg failure, and other ill effects in cormorants and Caspian terns). Thus, when setting enviornmental protection standards, the Administrator must consider not only the effects on plants, fish, or wildlife which directly take up toxic pollutants deposited from the air onto land or into water, but also the effects on fish, wildlife, and other life higher up the food chain.

This legislation requires protection of the environment from these pollutants in three specific ways. First, it provides that for seven specific toxic contaminants which are persistent organics or heavy metals (alkylated lead compounds, polycyclic organic matter, hexachlorobenzene, mercury, PCBs, 2,3,7,8-tetrachlorodibenzofurans, and 2,3,7,8-tetrachlorodibenzo-p-dioxin), the Administrator shall lower the 10-ton threshold in the "major source" definition to a level which results in setting MACT standards for the sources of at least 90 percent of the emissions of each of these pollutants. The result of this is to assure that the sources of at least 90 percent of the emissions of each pollutant are subject to stringent technology-based controls in the first phase of the program established by this legislation.

Second, the legislation requires the Administrator to protect against all significant environmental effects when setting residual risk standards in the second phase. The scope of this authority is to be broadly construed. It relates to all hazardous air pollutants, not just the seven singled out for attention at the MACT stage. Further, it relates to all environmental effects of listed pollutants, not just those related to air deposition into lakes or coastal waters.

Third, the legislation creates a specific program of studies and actions for the protection of the Great Lakes, Lake Champlain, and coastal waters.

It bears emphasis that the focus of this discussion on the Great Lakes region should not be misconstrued to suggest that the Administrator may limit his or her concern to Great Lakes area issues when implementing the enviornmental protection mandates of this legislation. For one thing, the legislation specifically covers coastal water resources and Lake Champlain, in addition to the Great Lakes. More important is the fact that the enviornmental effects definition is a general one that (as stated above) encompasses all effects on the environment covered by the term "welfare" under current law, and is in no way limited to effects that occur in, or are mediated through, water bodies. And, in addition to the Administrator's special responsibilities under the Great Lakes/coastal water provisions of this legislation, it is the Administrator's mandate when establishing residual risk standards to protect any significant threat to any environmental value encompassed by these definitions.

Definitions established in current law for "owner or operator", and "existing source" remain in the Act unchanged by this title.

List of Pollutants.—The amendments to section 112 made by this legislation are intended to accelerate the regulation of hazardous air pollutants by creating a program of technology-based standards similar to those which have already been implemented under the Clean Water Act for control of toxic effluent discharges to surface waters from major industrial sources. The legislation will establish emission standards for the major sources of a list of air pollutants carefully screened to include only those pollutants previously deemed harmful by the Congress, the Environmemtal Protection Agency, other Federal agencies or the States.

By establishing in the statute an initial list of chemicals to be regulated and requiring that the standards be based on maximum achievable control technology, the bill forces regulatory action to overcome the inertia that has plagued the health-based, standard-setting processs authorized by current law. The reported bill creates a strong presumption to regulate a very large number of air pollutants, mitigated to some extent by a less stringent (technology-based) regime than is mandated by under current law. Section 112(d) established a non-discretionary duty of the Administrator (subject to citizen suit under section 304 of the Act) to promulgate technology-based emissions standards for all categories and subcategories of major emitting sources of listed hazardous air pollutants.

The air pollutants subject to regulation under the provisions of section 122(d) are (initially) 191 substances listed in the statutory language of subsection (b) of the amended section 112. These pollutants are also listed in Figure III.4 of this report.

The Administrator is authorized to add or delete substances from this initial list.

TABLE III.4.—HAZARDOUS AIR POLLUTANTS

CAS number	Chemical name
75070	Acetaldehyde
60355	Acetamide
75058	Acetonitrile
98862	Acetophenone
53963	2-Acetylaminofluorine
107028	Acrolein
79061	Acrylamide
79107	Acrylic acid
107131	Acrylonitrile
107051	Allyl chloride
92671	4-Aminobiphenyl
7664417	Ammonia
62533	Aniline
90040	o-Anisidine
1332214	Asbestos
71432	Benzene (including benzene from gasoline)
92875	Benzidine
98077	Benzotrichloride
100447	Benzyl chloride
92524	Biphenyl
117817	Bis(2-ethylhexyl)phthalate (DEHP)
542881	Bis(chloromethyl)ether
75252	Bromoform
106990	1,3-Butadiene
156627	Calcium cyanamide
105602	Caprolactam
133062	Captan
63252	Carbaryl
75150	Carbon disulfide
56235	Carbon tetrachloride
463581	Carbonyl sulfide
120809	Catechol
133904	Chloramben
57749	Chlordane

TABLE III.4.—HAZARDOUS AIR POLLUTANTS—Continued

CAS number	Chemical name
7782505	Chlorine
79118	Chloroacetic acid
532274	2-Chloroacetophenone
108907	Chlorobenzene
510156	Chlorobenzilate
67663	Chloroform
107302	Chloromethyl methyl ether
126998	Chloroprene
1319773	Cresols/Cresylic acid (isomers and mixture)
95487	Cresols/Cresylic acid (isomers and mixture)
108394	Cresols/Cresylic acid (isomers and mixture)
106445	Cresols/Cresylic acid (isomers and mixture)
98828	Cumene
94757	2,4-D, salts and esters
3547044	DDE
334883	Diazomethane
132649	Dibenzofurans
96128	1,2-Dibromo-3-chloropropane
84742	Dibutylphthalate
106467	1,4-Dichlorobenzene(p)
91941	3,3-Dichlorobenzidene
111444	Dichloroethyl ether (Bis(2-chloroethyl)ether)
542756	1,3-Dichloropropene
62737	Dichlorvos
111422	Diethanolamine
121697	N,N-Diethyl aniline (N,N-Dimethylaniline)
64675	Diethyl sulfate
119904	3,3′-Dimethoxybenzidine
60117	Dimethyl aminoazobenzene
119937	3,3′-Dimethyl benzidine
79447	Dimethyl carbamoyl chloride
68122	Dimethyl formamide
57147	1,1-Dimethyl hydrazine
131113	Dimethyl phthalate
77781	Dimethyl sulfate
534521	4,6-Dinitro-o-cresol, and salts
51285	2,4-Dinitrophenol
121142	2,4-Dinitrotoluene
123911	1,4-Dioxane (1,4-Diethyleneoxide)
122667	1,2-Diphenylhydrazine
106898	Epichlorohydrin (1-Chloro-2,3-epoxypropane)
106887	1,2-Epoxybutane
140885	Ethyl acrylate
100414	Ethyl benzene
51796	Ethyl carbamate (Urethane)
75003	Ethyl chloride (Chloroethane)
106934	Ethylene dibromide (Dibromoethane)
107062	Ethylene dichloride (1,2-Dichloroethane)
107211	Ethylene glycol
151564	Ethylene imine (Aziridine)
75218	Ethylene oxide
96457	Ethylene thiourea
75343	Ethylidene dichloride (1,1-Dichloroethane)
50000	Formaldehyde
76448	Heptachlor
118741	Hexachlorobenzene
87683	Hexachlorobutadiene
77474	Hexachlorocyclopentadiene
67721	Hexachloroethane
822060	Hexamethylene-1,6-diisocyanate
680319	Hexamethylphosphoramide
110543	Hexane

TABLE III.4.—HAZARDOUS AIR POLLUTANTS—Continued

CAS number	Chemical name
302012	Hydrazine
7647010	Hydrochloric acid
7664393	Hydrogen fluoride (Hydrofluoric acid)
7783064	Hydrogen sulfide
123319	Hydroquinone
78591	Isophorone
58899	Lindane (all isomers)
108316	Maleic anhydride
67561	Methanol
72435	Methoxychlor
74839	Methyl bromide (Bromomethane)
74873	Methyl chloride (Chloromethane)
71556	Methyl chloroform (1,1,1-Trichloroethane)
78933	Methyl ethyl ketone (2-Butanone)
60344	Methyl hydrazine
74884	Methyl iodide (Iodomethane)
108101	Methyl isobutyl ketone (Hexone)
624839	Methyl isocyanate
80626	Methyl methacrylate
1634044	Methyl tert butyl ether
101144	4,4-Methylene bis(2-choroaniline)
75092	Methylene chloride (Dichloromethane)
101688	Methylene diphenyl diisocyanate (MDI)
101779	4,4′-Methylenedianiline
91203	Naphthalene
98953	Nitrobenzene
92933	4-Nitrobiphenyl
100027	4-Nitrophenol
79469	2-Nitropropane
684935	N-Nitroso-N-methylurea
62759	N-Nitrosodimethylamine
59892	N-Nitrosomorpholine
56382	Parathion
82688	Pentachloronitrobenzene (Quintobenzene)
87865	Pentachlorophenol
108952	Phenol
106503	p-Phenylenediamine
75445	Phosgene
7803512	Phosphine
7723140	Phosphorus
85449	Phthalic anhydride
1336363	Polychlorinated biphenyls (Aroclors)
1120714	1,3-Propane sultone
57578	beta-Propiolactone
123386	Propionaldehyde
114261	Propoxur (Baygon)
78875	Propylene dichloride (1,2-Dichloropropane)
75569	Propylene oxide
75558	1,2-Propylenimine (2-Methyl aziridine)
91255	Quinoline
106514	Quinone
100425	Styrene
96093	Styrene oxide
1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin
79345	1,1,2,2-Tetrachloroethane
127184	Tetrachloroethylene (Perchloroethylene)
7550450	Titanium tetrachloride
108883	Toluene
95807	2,4-Toluene diamine
584849	2,4-Toluene diisocyanate
95534	o-Toluidine
8001352	Toxaphene (chlorinated camphene)

TABLE III.4.—HAZARDOUS AIR POLLUTANTS—Continued

CAS number	Chemical name
120821	1,2,4-Trichlorobenzene
79005	1,1,2-Trichloroethane
79016	Trichloroethylene
95954	2,4,5-Trichlorophenol
88062	2,4,6-Trichlorophenol
121448	Triethylamine
1582098	Trifluralin
540841	2,2,4-Trimethylpentane
108054	Vinyl acetate
593602	Vinyl bromide
75014	Vinyl chloride
75354	Vinylidene chloride (1,1-Dichloroethylene)
1330207	Xylenes (isomers and mixture)
95476	Xylenes (isomers and mixture)
108383	Xylenes (isomers and mixture)
106423	Xylenes (isomers and mixture)
0	Antimony Compounds
0	Arsenic Compounds (inorganic including arsine)
0	Beryllium Compounds
0	Cadmium Compounds
0	Chromium Compounds
0	Cobalt Compounds
0	Coke Oven Emissions
0	Cyanide Compounds [1]
0	Glycol ethers [2]
0	Lead Compounds
0	Manganese Compounds
0	Mercury Compounds
0	Mineral fibers [3]
0	Nickel Compounds
0	Polycylic Organic Matter [4]
0	Radionuclides (including radon) [5]
0	Selenium Compounds

---

[1] $X^{+}CN$ where $X = H^{+}$' or any other group where a formal dissociation may occur. For example KCN or $Ca(CN)_2$.

[2] Includes mono- and di- ethers of ethylene glycol, diethylene glycol, and triethylene glycol $R\text{-}(OCH2CH2)_n\text{-}OR'$ where
$n = 1, 2,$ or 3
R = alkyl or aryl groups
R' = R, H, or groups which, when removed, yield glycol ethers with the structure: $R\text{-}(OCH2CH)_n\text{-}OH$
Polymers are excluded from the glycol category.

[3] Includes glass microfibers, glass wool fibers, rock wool fibers, and slag wool fibers, each characterized as "respirable" (fiber diameter less than 3.5 micrometers) and possessing an aspect ratio (fiber length divided by fiber diameter) greater than 3.

[4] Includes organic compounds with more than one benzene ring, and which have a boiling point greater than or equal to 100 °C.

[5] A type of atom which spontaneously undergoes radioactive decay.

Note: For all listings above which contain the word "compounds" and for glycol ethers, the following applies: Unless otherwise specified, these listings are defined as including any unique chemical substance that contains the named chemical. (i.e., antimony, arsenic, etc.) as part of that chemical's infrastructure.

The 191 pollutants on the initial list are derived from a list of 224 substances which the Committee selected for regulation under the clean air legislation reported in 1987. (For a more thorough discussion of the considerations that led to selection of these 224 substances, see U.S. Senate Report 100-231, "Clean Air Standards Attainment Act of 1987").

Subsequent to that report, the Environmental Protection Agency has carefully reviewed and revised the list deleting items with low toxicity, low potential for emissions to the air, and low exposure and adding several substances which have been identified as high priorities for regulation by EPA screening studies conducted under the authority of section 112. The Agency also added approximately a dozen substances. The substances listed in the reported bill are precisely the same substances which the President recommended in the legislation (S. 1490) that he proposed. Some witnesses appearing in hearings before the Committee have expressed a strong preference for a list prepared by technical experts at EPA, rather than one drawn up in the legislative process. The 191 substances identified in the statutory language are the EPA list without any modification made by the Committee.

The original list of 224 substances identified by the Committee in 1987 was selected from the conjunction of three other lists: 1) those substances listed pursuant to section 313 of the Emergency Planning and Community Right-to-Know Act of 1987; 2) those substances listed as high-priority environmental contaminants by the Agency for Toxic Substances and Disease Registry (ATSDR) pursuant to section 104(i) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA); and 3) those air pollutants for which at least one State or local air pollution control agency has established an "acceptable ambient concentration" or standard as noted in the National Air Toxic Information Clearinghouse (NATICH) data base for July, 1986.

The deletion of a substance which was included on the list of 224 substances reported by the Committee in 1987 should not be interpreted as a determination that such substance may not be added to the list if the Administrator receives evidence indicating that the health or environmental affects of the substance meet the criteria for listing described above.

The Administrator is given authority to periodically review and revise the list by adding or deleting substances. A complete review must be conducted at least once every five years. In addition any person may petition the Administrator at any time to modify the list by adding or removing a substance. The Administrator is to grant or deny (with a written explanation) any petition within 12 months.

The Administrator shall add a substance to the list under either one of two conditions: 1) the petitioner has shown that the substance is an air pollutant that is known to cause or may reasonably be anticipated to cause adverse effects on human health or the environment because of emissions, ambient concentrations, deposition or bioaccumulation; or 2) the petitioner has shown that the substance is an air pollutant which would qualify for addition to the list of substances established by section 313 of the Emergency Planning and Community Right-to-Know Act of 1986. That listing authority describes three criteria which are generally: 1) acute human health effects; 2) chronic human health effects; or 3) significant adverse environmental effects. The criteria are more fully described at pages 293–295 of House Report 99–962, the Conference Report on the Superfund Amendments and Reauthorization Act of 1986, as follows:

> . . . A chemical should be listed if the Administrator determines, in the Administrator's judgment, that there is sufficient evidence to establish any one of the following:
>
> 1. Acute human health effects—The chemical is known to cause or can reasonably be anticipated to cause significant adverse acute human health effects at concentration levels that are reasonably likely to exist beyond facility

site boundaries as a result of continuous, or frequently recurring, releases.

In making this determination, the Administrator is to consider individuals who are sensitive to a particular chemical. The determination that concentration levels capable of causing a significant acute adverse effect are reasonably likely to exist beyond facility site boundaries requires consideration of factors in addition to the chemical toxicity and other properties of a substance. For example, it is possible that a particular chemical, while it could cause a significant acute adverse effect at a high concentration level, would be very unlikely to reach that concentration level beyond the facility site boundary because of volume and pattern of use or release and other chemical-specific factors. To include a substance on the list on the basis of this criterion, the Administrator would determine that, within the United States, concentration levels that can cause the effects described above are reasonably likely to occur as a result of continuous or frequently recurring releases. The term "continuous or frequently recurring releases" is included only to distinguish routine releases that are a normal consequence of the operation of the facility from the episodic and accidental releases that are subject to section 304 (of SARA). There is no requirement to make any facility-specific finding, and it is not necessary actually to demonstrate these concentration levels or effects near any particular facility.

The phrase "beyond facility site boundaries" means any point outside the boundaries of the site on which the facility is located. With regard to some types of chemicals and patterns of discharge and dispersal, the highest concentration to which persons outside the site boundary may be exposed will occur adjacent to the boundary. In other cases, the highest concentration may occur some distance away, as when an air emissions plume cools and settles to the ground.

2. Chronic human health effects—The chemical is known to cause or can reasonably be anticipated to cause in humans—

  (i) cancer or teratogenic effects, or
  (ii) serious or irreversible—
    (I) reproductive dysfunctions,
    (II) neurological disorders,
    (III) heritable genetic mutations, or
    (IV) other chronic health effects.

The phrase "in humans" in subsection (d)(2)(B) clarifies that health effects are to be considered insofar as they are or reasonably can be anticipated to be manifested in human beings as distinct from other organisms. It does not limit the Administrator to considering only substances for which there are human data.

3. Adverse environmental effects—The chemical is known to cause or can reasonably be anticipated to cause, because of—

(i) its toxicity,

(ii) its toxicity and persistence in the environment, or—

(iii) its toxicity and tendency to bioaccumulate in the environment,

a signifcant adverse effect on the environment of sufficient seriousness, in the judgment of the Administrator, to warrant reporting under this section.

In determining what constitutes a significant adverse effect on the environemnt that would warrant reporting under this section, the Administrator should consider the extent to which the toxic chemical causes or reasonably can be anticipated to cause any of the following adverse reactions, even if restricted to the immediate vicinity adjacent to the site:

(1) Gradual or sudden changes in the composition of animal life or plant life, including fungal or microbial organisms in an area.

(2) Abnormal number of deaths of organisms (e.g. fish kills).

(3) Reduction of the reproductive success or the vigor of a species.

(4) Reduction in agricultural productivity, whether crops or livestock.

(5) Alterations in the behavior or distribution of a species.

(7) Long lasting or irreversible contamination of components of the physical environment, especially in the case of groundwater, and surface water and soil resources that have limited self-cleaning capacity.

The use of the term "bioaccumulate" is not intended to distinguish between this term and other technical terms such as "bioconcentrate" and "biomagnify" that sometimes are used interchangeably.

The number of toxic chemicals included on the list solely on the basis of adverse environmental effects as described above may not exceed 25 percent of the total number of listed chemicals.

In making a determination that a chemical meets any of the toxicity criteria under subsection (d)(2) the Administrator must consider generally accepted scientific principles of toxicity evaluation or, data from laboratory toxicity tests, or appropriately designed and conducted epidemiological and other studies of populations, available to the Administrator.

The Administrator, in determining to list a chemical under any of the above criteria, may, but is not required to, conduct new studies or risk assessments or perform site-specific analyses to establaish actual concentrations or to document adverse effects at any particular location.

The Administrator may add a substance to the list on the Administrator's own motion using the criteria which apply to a determination made on any petition to add a substance.

The Administrator is directed to remove a substance from the list upon a showing by the petitioner that one of two conditions obtain: 1) there is adequate data on the health and environmental effects of the substance and from such data the Administrator can conclude that ambient concentrations or emissions of the pullutant will not cause any adverse effects on either human-health or the environment; or 2) the substance qualifies for deletion from the list established pursuant to section 313 of the Emergency planning and Community Right-to-Know Act of 1986. The Administrator may provide general guidance for use by petitioners as to the evidence necessary to demonstrate that adequate data is available on the health and environmental effects of the substance in support of a delisting petition. This is not intended to be an extraordinary data production requirement, but in light of the fact that the pollutant has already been listed because of health or environmental concerns, the testing required should include the full range of investigations that would be required of a high-volume chemical in commerce to complete an adequate health assessment as described in the National Research Council report "Toxicity Testing" and the Guidelines for Risk Assessment published by the Agency in September of 1986. This data would, of course, include exposure information adequate to demonstrate with a high degree of confidence that emissions, ambient concentrations or exposure through other pathways including atmospheric transformation products, deposition, bioaccumulation and transmission through the food chain or water supply, will not cause adverse effects.

Criteria for the delegation of a substance from the list established under section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 is stated in the SARA Conference Report cited at page 295 and reads as follows:

> (Subsection (d)(3) of the conference substitute provides that) [a] chemical may be deleted from the list if there is not sufficient evidence to meet any of the criteria described in paragraph (2) (described above). A chemical need only meet one of the three criteria listed in subparagraphs (A), (B) or (C) of paragraph (2) to be listed. Similarly, a chemical will be deleted only if it fails to meet any of these three criteria.

When considering the adverse health effects from a toxic pollutant, the Administrator must include the extent to which such pollutant may adversely affect human health by contaminating the human food chain and surface waters used as drinking water supplies. Human exposure to airborne toxic chemicals that contaminate food and water may provide an important addition to the body burden for such chemicals beyond that already received through direct inhalation. As under present law, it is a sufficient basis for listing a pollutant that air emissions contribute (through multiple pathways) to the total body burden of that substance. It is not necessary to demonstrate that the contribution from direct inhalation of air emissions alone is sufficient to cause adverse health effects.

It is not expected that substances listed by the Agency for Toxics Substances and Disease Registry pursuant to section 104(i) of

CERCLA will be deleted from the list, since those substances listed by ATSDR have demonstrated toxic effects.

The pollutants listed in the statutory language of section 112(b) include both individual chemical substances (designated by their Chemical Abstracts Registry Service numbers and common names) and categories of chemical substances. The categories are further defined in footnotes to the list. For instance, metal compounds and cyanide compounds are listed because of the known toxicity of the metal or cyanide component. This toxicity is anticipated to be conferred on a metal compound by the presence of the metal in its structure or expressed when a metal or cyanide compound is chemically or biologically transformed (during or after its release into the environment) to yield the toxic metal or cyanide.

Individual chemical substances that are members of a category may vary in their toxicity or potential to yield a toxic constituent upon transformation. The Administrator may take account of this variability, as the Administrator determines to be appropriate, when modifying the definition of major source pursuant to section 112(a), when defining minimum emissions rates pursuant to section 112(c), or when making listing decisions under section 112(b). The Administrator may also base these determinations on the weight or emissions rate of constituent toxic metal or cyanide, rather than on those of their compounds.

No substance, practice, process or activity regulated under title V of the Clean Air Act (relating to the protection of the stratospheric ozone layer) will be subject to regulation under section 112 solely because of its impact on stratospheric ozone. The same substance may be regulated under section 112 due to its health impacts (for instance, carbon tetrachloride is both a probable human carcinogen on the "intent-to-list" list and has significant potential to deplete stratospheric ozone and, thus, would be appropriately regulated pursuant to the provisions of section 112 and title V of the Act). Furthermore, there is no prohibition on addressing the ozone depletion properties of a substance or activity not regulated under title V in the context of emissions standards under section 112.

Whenever the Administrator finds that there is insufficient information to make a listing determination or respond to a petition under section 112(b), the Adminstrator is to use the information-gathering authorities of section 104(i) of the Comprehensive Environmental Response, Compensation, and Liability Act, section 114 of the Clean Air Act and authorities available under other laws, including the testing authorities of the Toxic Substances Control Act, to gather the information necessary to make a determination.

The Administrator may develop test methods and other analytical procedures for monitoring emissions, ambient concentrations, deposition and bioaccumulation of air pollutants listed pursuant to section 112(b). The Agency already has an on-going program in this area. These methods must be specified with sufficient sensitivity to allow the owners and operators of sources, pollution control agencies, and others to distinguish reliability between major and area sources and to determine compliance with emission standards once established. Monitoring and analytical methods should be developed as expeditiously as practicable so as to the useful in the standard development effort. The unavailability of a monitoring or analytical methodology, however, shall not delay the establishment or enforcement of standards under section 112. Where it is not feasible to measure emissions at all, section 112(h) provides the Administrator with authority to prescribe design standards and work practices in lieu of emissions standards.

The Administrator may determine that a technique for measuring one pollutant may serve as a surrogate for measuring another, but only if the Administrator finds, after allowing an opportunity for comment, that there is a significant correlation between the emissions or ambient levels of such pollutants with a high degree of statistical confidence.

List of source categories.—The Administrator is directed to publish, within twelve months of the date of enactment of the bill, a list of the categories and subcategories of major emitting sources of the 191 air pollutants (initially) listed pursuant to subsection (b) of the amended section 112. A technology-based emission standard will subsequently be promulgated for each category or subcategory. A definition for "major source" is included in section 112(a) and provides that any source emitting more than 10 tons per year of any listed pollutant or 25 tons per year of eny combination of pollutants is a major source.

Pursuant to the definition of major source (and at the time pollutants or source categories are listed) the Administrator is given authority to include sources emitting a lesser quantity of the listed pollutant or pollutants in a major source category or subcategory, if the potency of the pollutant emitted or other factors would warrant the imposition of a technology-based emission standard. At the time that an emissions standard is actually promulgated for the source category or subcategory, the Administrator may redefine the lower threshold of emissions (tons of the pollutant emitted) which defines the category and determines which particular sources will be subject to the standard.

In some cases, the 10 ton per year lower boundary for a pollutant or 25 ton per year lower boundary for a combination of pollutants may be arbitrarily stringent and a less stringent boundary would better reflect the subset of similar sources which should be subject to a standard from the perspective of emissions, exposure, environmental and economic circumstances. In redefining the lower boundary which establishes a source category, the Administrator may not select an emissions rate above 10 tons per year for any one pollutant or 25 tons per year for any combination, except in the case where the health effects of the pollutant or pollutants are well-characterized and a "safe" level of exposure has been established. The lower boundary may not be higher than this health threshold with an ample margin of safety. Costs are not to be considered when determining an ample margin of safety and the lower boundary shall be below the emission rate where adverse environmental effects are expected to occur.

The Administrator must list categories of area sources which warrant regulation under section 112. These area sources may be subject to a MACT standard or may be regulated with an emissions standard reflecting control technology which is "generally" available to the sources in the category as described below. Listing of an area source category under this subsection may occur because of health and environmental risks associated with emissions from the sources in the category considered individually or because of the risks posed by emissions from a number of the sources in the aggregate (for instance, particulate emissions from wood stoves).

The Administrator is to assure that source categories and subcategories for six of the listed pollutants (alkylated lead compounds, polycyclic organic matter, hexachlorobenzene, mercury, polychlorinated biphenyls, 2, 3, 7, 8-tetrachlorodibenzo-p-dioxin, and 2, 3, 7, 8-tetrachlorodibenzo-furans) are established so that sources accounting for at least 90 percent of the emissions of each of these pollutants are subject to emissions standards requiring the maximum reduction in emissions achievable (MACT standards) pursuant to section 112(d)(1). For most or all of these pollutants, this requirement will mean that the lower boundary of emissions defining the source category or subcategory will be substantially below 10 tons per year. These pollutants are of special concern because of their environmental impacts and their propensity to bioaccumulate or otherwise harm aquatic organisms and migratory bird populations.

When air pollutants are subsequently added to the list established under section 112(b), the Administrator shall simultaneously list the major or area source categories of the pollutant. At the time of listing any category (subsequent to the initial listing described above) the Administrator shall also establish a date for the promulgation of emissions standards for the category. Considering the schedules otherwise imposed under this section, emissions standards should generally be promulgated not later than two year after the category is listed.

To facilitate consistency in the regulatory process, the Administrator is expected to establish source categories under this section so as to parallel, to the extent practicable, the categories established under section 111 for new source performance standards and under part C for the prevention of significant deterioration (where new sources are subject to best available control technology requirements). This language is not intended to limit the listings under this subsection to only those categories already subject to other provisions. The categories established here must include all major sources of the listed pollutants.

In establishing categories, the Administrator may take into account factors such as industrial or commercial category, facility size, type of process and other characteristics of sources which are likely to affect the feasibility and effectiveness of air pollution control technology. Cost and feasibility are factors which may be considered by the Administrator when establishing an emissions limitation for a category under section 112. The proper definition of categories, in light of available pollution control technologies, will assure maximum protection of public health and the environment while minimizing costs imposed on the regulated community. However, in limited circumstances where a group of sources may share the characteristics of other sources in the category, the Administrator may establish subcategories for such sources.

Nothing in this language authorizes the establishment of a category based wholly on economic grounds nor is there any implication that individual facilities may be granted *categorical* waivers (that is—separate categories will not be established for one or a few sources) from requirements that would apply to other sources of a similar size, type or character based on assertions of extraordinary economic effects.

Emissions standards.—Subsection (d) of the amended section 112 gives definition to the criteria for technology-based standards which the Administrator is to employ in determining the appropriate emissions limitation for each category or subcategory of major sources.

Generally, the formula included here provides for the maximum degree of reduction in emissions for each pollutant which is achievable by the sources in the category taking cost and other factors into account. The benchmark for the categorical standard is not an average level (or some other percentile) of control across sources in the category, but, at a minimum, the most stringent level of control achieved in practice by a source of a similar size, type, and character.

In 1984 the Committee reported legislation to amend the Clean Air Act and at that time conducted a thorough review of the "best available control technology" or BACT concept as applied to new sources in the program for the prevention of significant deterioration (PSD) in part C of title I of the Act. The report issued on that legislation indicated that the case-by-case BACT determinations being made for PSD were not sufficiently stringent and in many cases provided no more control than would have been required through application of new sources performance standards. To rectify this insufficiency and to further integrate control technology requirements under various part of the Act, the 1984 bill amended the BACT review under the PSD program, replaced LAER with BACT in the non-attainment program and proposed to add a BACT concept to section 112. Although the 1984 bill was not ultimately enacted and this legislation does not make extensive modifications to the PSD program, some of the conceptual work done for the 1984 bill is carried over to this new subsection establishing technology-based standards for major sources of noncriteria air pollutants.

An emissions limitation based on section 112(d) will, in most cases, be more stringent than a new source performance standard for the same category of sources or pollutants. It will also generally be more stringent than an emissions limitation based on reasonably available control technology imposed under part D as the emission limitation here must be equivalent to the most stringent degree of control achieved in practice. That is appropriate as this program is for the control of extremely harmful air pollutants and is also reflected in other provisions included in this section (the 10 ton per year definition of major source, the authority to consider and reduce residual health and environmental risks, and so on). Emissions limitations promulgated under this subsection will be equivalent to LAER in most cases.

An emissions limitation imposed here, and the standard for control which is its foundation, shall generally be referred to as the "maximum achievable control technology" or MACT to distinguish it from other requirements in the Act. MACT standards must be promulgated for all source categories listed pursuant to section 112(c)(1).

The technology-based standards promulgated pursuant to this authority shall provide for the maximum degree of reduction in emissions of each of the listed pollutants released by sources in the category. In some cases one control technology (e.g., scrubber, adsorber, secondary containment, steam-stripping) may be the technology which provides the maximum degree of reduction for several or even a large class of the listed pollutants. In cases where a single control technology (combustion temperature, for instance) may be calibrated or configured in a variety of ways depending on the principal pollutant of concern, the Administrator shall select that configuration or calibration which provides the greatest protection to human health (unless the incremental health protection is negligible and there are very significant environmental values that would be afforded protection by some other configuration). In cases where control strategies for two or more different pollutants are in actual conflict, the Administrator shall apply the same principle—maximum protection of human health shall be the objective test.

There may be pollutants which because they are emitted from more than one point in a facility or because they are particularly difficult to control require the application of more than one control technology at the same site. For instance, adequate control of dioxin emissions from municipal waste combustion units is best achieved through a combination of good combustion practices and the installation of acid gas scrubbers. In another case, a particular VOC may be released from both a stack and from non-point sources in the facility. In the latter case, MACT will be determined for each type of emissions point and not for the facility as a whole.

The technologies, practices or strategies which are to be considered in setting emission standards under this subsection go beyond the traditional end-of-the-stack treatment or abatement system. The Administrator is to give priority to technologies or strategies which reduce the amount of pollution generated through process changes or the substitution of materials less hazardous. Pollution prevention is to be the preferred strategy wherever possible.

A second class of control requirements focusing on the enclosure of emissions points of other secondary containment system is also to be considered before system to collect, capture or treat the emissions are reviewed. Considering municipal waste combustion as a potential category of major sources to illustrate these concepts (even though standards for MWC are set independently by another section of this title): source separation and good combustion are examples of process modifications; covered facilities for ash handling and negative air flow are examples of enclosure and secondary containment; operator training is an example of a work practice standard; and scrubbers, precipitators and selective catalytic reduction are examples of end-of-the-stack treatment systems. All four approaches are to be considered in determining the degree of control which is the maxium achievable for each category or subcategory.

The Administrator may take the cost of achieving the maximum emission reduction and any non-air quality health and environmental impacts and energy requirements into account when determining the emissions limitation which is achievable for the sources in the category or subcategory. Cost considerations are reflected in the selection of emissions limitations which have been achieved in practice (rather than those which are merely theoretical) by sources of a similar type or character. An emissions limitation achieved in practice is one based on control technology that works reasonably well (doesn't require frequent and extensive modification or repair) under realistic operating conditions. This is not a cost-effectiveness or cost-benefit test. Specifically, the policy enunciated by the Office or Management and Budget in a letter to the then-Assistant Administrator for Policy at the Environmental Protection Agency and dated December 9, 1983 calling for a cost-effectiveness test in the NESHAPs for inorganic arsenic and radionuclides is rejected. The number of cancers prevented per dollar invested is not any part of the definition of maximum achievable control technology as used here (or elsewhere in the Act).

The legislation allows emissions limitations applicable to existing sources to be less stringent than those which apply to new sources of the same type. In testimony before the Committee, some have argued that the legislation provides no "floor" for standards and gives the Administrator authority to undermine the essential meaning of a standard which requires the "maximum" reduction in emissions which is achievable.

The considerations which the Administrator is to balance when setting standards under this or other sections of the Act are often a tangled web. Here, there are three competing principles which must be reconciled:

(1) the Administrator is to mandate the maximum reductions achievable;

(2) the standard is to take cost into account; and

(3) the Administrator can establish categories and subcategories of sources.

Requiring an arbitrary "floor" or target for an emissions limitation which is designed to override the principle that costs are to be considered, simply invites the Administrator to subdivide the universe of sources into groups so small that each unit is required to achieve no more than its own reflection to satisfy an MACT standard.

This bill describes the standard-setting process from a point of departure. First, standards for all sources, both new and existing, are to achieve the "maximum reduction achievable". That may include emissions limitations lower than are being achieved by any other comparable source in practice including a prohibition on emissions.

Second, and with respect to existing sources, the emissions limitation for a category or subcategory is to be as stringent as that applicable to new sources unless the Administrator determines that compliance with such a limitation is infeasible for some sources in the category. Infeasible means that the sources would discontinue operation or be severly damaged as economic entities, if the limitation was imposed. To deny that this should be a consideration or that the variation from the limitation (which can be achieved by new sources) should be capped or constrained arbitrarily by a floor or target, is to deny the role for consideration of cost which is clearly stated in the legislation.

Third, if new source limitations are infeasible, the Administrator is to establish the MACT standard for the existing source category using the "top-down" process for BACT determinations which has recently been adopted by the Agency in the PSD program. In fact, this approach was adopted for PSD in part because of the dissatisfaction with BACT standards which was expressed in the 1984 Committee report described above.

The "top-down" standard-setting analysis begins with the most stringent level of emission control achieved by any comparable source in practice. That level of control is to be imposed, unless the Administrator can demonstrate that an emissions limitation at such level is infeasible for some sources in the category.

Upon demonstrating the limitation to be infeasible for some sources, the Administrator has two options. First, the Administrator may select and review the next most stringent level of emission control achieved in practice by a source in the category using the same criteria discussed above. In the alternative, the Administrator may reorganize the category into subcategories applying the original and more stringent limitation to those sources for which it is feasible. Sources for which the standard is not feasible would be organized in a separate group and assigned an alternative emission limitation to be determined using the same considerations.

In chosing between these two alternatives (lowering the standard for all sources or subdividing the category), the legislation instructs the Administrator to select the strategy which maximizes the overall emission reduction that can be achieved. The purpose of the legislation is to assure that each and every source will employ the control methods which assure the greatest reduction in emissions which are achieveable for that source taking cost and other factors into account. Although this is not a case-by-case determination, there is sufficient flexibility in the standard-setting process to assure that the goal—the maximum reduction achievable—and not some alternative, and arbitrary, target is actually achieved.

In addition to the anlytical process described here, the legislation contains two other guideposts. First, emissions reductions for existing sources of volatile organic compounds subject to MACT requirements should average 90 percent or more from uncontrolled levels across all categories and subcategories (95 percent for sources of particulate emissions). This is in line with the experience with technology standards under the Clean Water Act where reductions for existing sources have averaged more than 90 percent.

And second, emissions limitations which do not eliminate all residual risks (including risks of cancer exceeding 1-in-1,000,000 and emissions for "threshold" pollutants exceeding the "safe" level) will result in further regulation of the sources in the category under subsection (f) or (g). A program which deliberately and consistently under-regulates in the technology-based phase will lead to more, and more stringent, regulation as the Agency moves to reduce residual risks.

Section 112(d)(1) requires the Administrator to consider subcategories of major sources and sections 112(d) (2) and (3) identify factors which the Administrator must consider in establishing the maximum degree of reduction in emissions that is achievable for existing and new sources in such subcategories. The Administrator may consider the type of process employed in making decisions on subcategories and standards.

A basic distinction in process in the chemical and other industries is between continuous and batch manufacturing methods. Continuous operations have a constant raw material feed to the process and continual product withdrawal from the process. A batch process has an intermittent introduction of raw materials into the process and, consequently, an intermittent release of air emissions. Further, a variety of products using different raw materials may be made in the same equipment over time. As a result, the application of air pollution control technology to batch processes may be more difficult or expensive than the application of such technology to continuous processes.

For some pollutants a MACT emissions limitation may be far more stringent than is necessary to protect public health and the environment. For some of the hazardous air pollutants listed under subsection (b) it is possible to establish a "no observable effects level" (NOEL) below which human exposure is presumably "safe". This NOEL or health-effects threshold may be higher than the level of emissions which can be achieved with application of maximum achievable control technology.

To avoid expenditures by regulated entities which secure no public health or environmental benefit, the Administrator is given discretionary authority to consider the evidence for a health threshold higher than MACT at the time the standard is under review. The Administrator is not required to take such factors into account; that would jeopardize the standard-setting schedule imposed under this section with the kind of lengthy study and debate that has crippled the current program. But where health thresholds are well-established, for instance in the case of ammonia, and the pollutant presents no risk of other adverse health effects, including cancer, for which no threshold can be established, the Administrator may use the threshold with an ample margin of safety (and not considering cost) to set emissions limitations for sources in the category or subcategory. Employing a health threshold or safety level rather than the MACT criteria to set standards shall not result in adverse environmental effects which would otherwise be reduced or eliminated.

For those categories of area sources which have been listed pursuant to section 112(c)(2), as amended, the Administrator has two regulatory options. First, the Administrator may establish a MACT standard for the category based on the considerations described above. In the alternative, the Administrator may require sources in the category to meet emissions limitations reflecting application of generally available control technology—that is, methods, practices and techniques which are commercially available and appropriate for application by the sources in the category considering economic impacts and the technical capabilities of the firms to operate and maintain the emissions control systems.

This alternative regulatory option is provided to encourage control of area sources. Listing area sources for control under this section is a discretionary authority with the Administrator. Experience under section 112 indicates that pollutants and source categories will not get listed if the only regulatory regime which meets statutory requirements is considered too costly for the public health benefits to be achieved. By providing the Administrator with a regulatory tool less stringent than MACT for area sources, the legislation provides additional avenues for public health and environmental protection.

An example of generally available control technology (or GACT) would be an equipment and operational standard for that portion of the dry cleaning industry which emits less than 10 tons per year of the dry cleaning solvent (perchloroethylene). An equipment standard is not an emissions limitation nor a limit on solvent consumption rates and does not require the sophisticated monitoring and modeling that may be necessary to determine compliance. Rather, an equipment standard would require neighborhood dry cleaning establishments to employ the commercially available systems associated with the lowest measured emissions, and may also specify operation and maintenance requirements for this equipment.

When establishing technology-based standards under this subsection, the Administrator may consider the benefits which result from control of air pollutants that are not listed but the emissions of which are, nevertheless, reduced by control technologies or practices necessary to meet the prescribed limitation. For instance, control technologies that reduce the emission of volatile organic compounds which are listed pursuant to this subsection may also have the effect of limiting other VOC emissions. These other compounds, although not listed, would be precursors of ozone pollution and control, even in attainment areas, may produce substantial health and environment benefits.

In no event shall an emissions standard promulgated under section 112 allow a source to increase emissions above that which is otherwise allowed for the source pursuant to section 111 (new source performance standards), part C (prevention of significant deterioration requiring case-by-case BACT), or part D (non-attainment requiring either RACT or LAER).

The Administrator is to review and revise emission standards promulgated under section 112(d) no less than every seven years.

Emission standards promulgated under section 112(d) shall be effective on the date of promulgation and, with respect to new sources, shall be applicable to all such sources which begin construction or reconstruction at any time after the standards were first proposed.

Schedule for Standards.—Subsection (e) of section 112, as amended by the bill, provides a schedule for the promulgation of technology-based standards pursuant to section 112(d) and criteria for establishing priorities for regulation among the various categories and subcategories of major sources for which standards must be set. The Administrator is to publish a complete list of the source categories and subcategories of the initially listed pollutants not later than 12 months after the date of enactment of the legislation. Emissions standards for the source categories of twelve pollutants (generally, those in the so-called "intent-to-list" group) are to be effective (that is promulgated) within 24 months. Thse pollutants are: acrylonitrile; benzene; 1,3-butadiene; cadmium; carbon tetrachloride; chloroform; chormium; ethylene dichloride; ethylene oxide;

methylene chloride; perchloroethylene; and trichloroethylene. In addition to these substances, the Administrator is also to finalize the emissions standards for coke ovens within the same 24-month period. It is expected that the Agency can meet this schedule, since these pollutants and the associated source categories have been studied for several years under the existing air toxics program.

As to standards for major source categories and subcategories of the other listed pollutants, the legislation establishes a three-part schedule. Emissions standards for 25 percent of the categories and subcategories must be effective within 3 years of enactment; standards for another 25 percent of the categories and subcategories must be effective within five years of enactment; and standards for all remaining categories and subcategories of major sources of the listed pollutants must be effective within 10 years of enactment. This scheduling device has been used previously in amendments to the Clean Air Act (with respect to new source performance standards under section 111 adopted by the Congress in 1977). A somewhat longer period of time was required to promulgate technology-based effluent guidelines under the Clean Water Act, but the greatest part of that activity was concluded within a comparable schedule.

When selecting source categories and subcategories to include within the first or second round of standards (to be issued within 3 or 5 years), the Administrator is to give highest priority to those major source categories which present the greatest threat to public health and the environment because of:

(1) the quantity of pollutants that will be emitted;

(2) the nature and severity of the adverse health and environmental effects which will be potentially caused; or

(3) the high risks experienced by the most exposed persons due to the location of the sources in the category or subcategory.

Considering that standards are to be issued for a whole stream of pollutants emitted by sources in some categories and that the pollutants in a stream may present unequal levels of risk, the Administrator may also consider the efficiency of the regulatory process when establishing the scheduled for control early in the process, because they would be controlled by application of the same technology or are emitted from sources emitting other pollutants that are of a high priority and a single rule-making would impose less cost and disruption for the regulated industry.

In scheduling the promulgation of any standard under this subsection, the Administrator may (except for the twelve listed pollutants and coke oven emissions) take into account other emissions limitations and requirements which are to be imposed on the same sources under other provisions of the Act and may, consistent with the need to protect public health and the environment, schedule standards for promulgation under this section in coordination with those requirements to assure the most effective and efficient regulatory program.

Sources should not be subject to a RACT requirement under part D one year and find in the following year that a new MACT standard requires an entirely different and more stringent level of control. The promulgation date for the MACT standard should be accelerated to avoid the imposition of unnecessary design and construction costs on industry. If the Administrator expects that a standard for the same pollutant under some other portion of the Act may be more stringent than a MACT emissions standard promulgated under section 112(d), the Administrator may defer the promulgation of the MACT standard until such time as the other standard is fully determined. However, given the stringency of the expected MACT standard until such time as the other standard is fully determined. However, given the stringency of the expected MACT standard, the latter instance should be much less likely to occur. No deadline for any other requirement of the Act is to be deferred by the Administrator or the courts as a provision to encourage coordination.

The Administrator is to publish a schedule for standard-setting under section 112(d). This schedule shall establish a date for MACT emissions standards for all of the source categories and subcategories which are listed pursuant to subsections (c)(1) (major sources) or (c)(2) (area sources) of section 112. Although the Administrator is to take comment before finalizing this list (and it is to be a final determination before the date 24 months after the date of enactment), the priority-setting process is not a rule-making and the Administrator's decision to schedule standards for any particular category or subcategory in any of the three subgroups is not subject to judicial review. However, once established, the Administrator has a non-discretionary duty to promulgate the standard for the category or subcategory by the date indicated and may be subject to citizen suit under section 304, if he fails to do so. The schedule for a standard to be promulgated is ultimately determined by the statute according to the objective criteria included in paragraph (2) of section 112(e). Once the Administrator has applied those criteria to listed source categories and set a schedule, it may not be modified at will to reflect other concerns or information which come to the Administrator's attention at a later time. To allow a recasting of the schedule whenever the Administrator is likely to fail to meet a deadline in order to avoid citizen suits would be to defeat a fundamental purpose of this section—to force action in the near-term to reduce the health and environmental threat used by hazardous air pollutants.

The Administrator's determination of priorities is given insulation from court challenge because of the complexity of the balancing involved and the extended nature of the litigation that might ensue, if all of the schedule were open to challenge in court. The Committee includes this deference to the Agency, notwithstanding the experience under the Clean Water Act where standards for some of the largest and most important industrial categories of toxic pollutants, including the synthetic organic chemical manufacturing and pesticide industries, were deferred until the end of the promulgation period. A similar result would be completely contrary to the intent of the legislation reported here.

Section 112(e) includes two exceptions to the general rules for scheduling standard-setting as described above. First, if the Administrator determines that utility boilers are to be regulated under section 112(d) with respect to the emission of chlorine gas or any compounds containing chlorine, the standard is to be deferred until a date not earlier than three years after the date of enactment of this legislation. The purpose for the deferral is to assure adequate time to characterize the chlorine compounds which may be emitted from utility boilders.

The subsection also defers regulation of emissions from publicly owned treatment works (POTWs) to a date not earlier *or later* than the date five years after enactment of the legislation. Again the reason for the deferral is a lack of emissions and control technology information that would be useful to the Administrator in establishing standards under subsection (d) of this section.

Unlike the bill reported here, legislation proposed by the Administration (S. 1490) does not require that all categories or subcategories of sources of the 191 pollutants listed pursuant to section 112(b) be regulated. Rather S. 1490 would provide that the Administrator is to study the emissions and exposures associated with the 50 percent of the source categories put in the third tier (for which standards are due in 10 years) and may or may not impose regulations for any particular category or subcategory.

This is discretion to leave 50 percent of the sources of the listed pollutants unregulated and is entirely inappropriate with respect to the goals of this legislation and the history of section 112. It is also unnecessary.

A sound statutory framework for a program as extensive as the one contemplated here should not force the Agency to regulate a category of sources which present no significant public health risk, simply because units in the category emit a pollutant which has been listed in the statute. That is the result which the Administration hopes to avoid careless mandates. But the legislation reported here can reach the same result without the threat of in action which looms so clearly in the Administration's proposal.

With respect to any particular pollutant three conditions may obtain: 1) there may be no evidence that the emissions of the pollutant cause health or environmental effects of concern; 2) the pollutant may be a known, probable or possible human carcinogen; 3) or the pollutant may have other health effects for which a threshold can be established.

In the first instance where there is no evidence of adverse health effects or no evidence of emissions which cause exposure, the Administrator should delist the pollutant upon receiving a petition to do so as provided in section 112(b). If a pollutant is delisted, no source category of the pollutant will be regulated.

In the case of carcinogens, there is a *prima facie* case that ten tons of emissions per year from any single source of the pollutant amounts to a health threat which should be regulated. Federal Government health policy since the mid-1950s has been premised on the principle that there is no safe level of exposure to a carcinogen and, unless all of the sources in the category are so remote that no human exposure occurs (a circumstance unclaimed for any source category at this time), standards should be imposed and the discretion not to act would be inappropriate.

Finally, there are the pollutants for which there are health and environmental effects (other than carcinogenicity or other no threshold effects) for which a "safe" level of exposure can be determined. In this case, the Administrator has two options to use in assuring that low priority regulation will not be required. First, under section 112(c)(5) the Administrator may set a lower boundary for the category of major sources which is higher than 10 tons per year (but which provides an ample margin of safety to protect public health). If there are no sources emitting the pollutant in that amount in a particular category, then no regulation under section 112(d) need be promulgated. In the second case, where some sources do emit more than the threshold amount, the Administrator is authorized by section 112(d)(4) to use the no observable effects level or NOEL (again with an ample margin of safety) as the emission limitation in lieu of more stringent "best technolgoy" requirements. Following this scenario, only those sources in the category which present a risk to public health (those emitting in amounts greater than the safety threshold) would be required to install controls, even though the general policy is "maximum achievable technology" everywhere. Again, there is a means to avoid regulatory costs which would be without public health benefit. Considering the measures designed to prevent undue regulation which already exist in the reported bill, and considering the history of abuse and abdication which has characterized section 112 through all of its history, the discretion not to regulate 50 percent of all sources of hazardous air pollutants is not an appropriate element in a sound statutory framework.

Voluntary Reduction.—Section 112(i)(6)(A) provides that an existing source shall be exempt from an emissions standard promulgated pursuant to section 112(d) if the owner or operator of such source demonstrates that the source will achieve a voluntary reduction of 90 percent or more in its emissions of hazardous air pollutants (95 percent or more in the case of hazardous air pollutants which are particulates) on or before December 31, 1992. The reduction must be below actual and verifiable emissions in a base year not earlier than calendar year 1985.

The purpose of this provision is to encourage early reductions in emissions of hazardous air pollutants. The standard-setting process under section 112, even considering the impetus provided by this legislation, is slow. It takes time for the government to set standards and additional time for industry to make the process and plant modifications which are necessary to come into compliance. The provision may in some cases forego additional emissions reductions in the years after a MACT standard is promulgated; the offsetting benefit is the early reduction which is achieved.

This provision is not intended as a reward for past practice or for compliance with air toxics programs which have been established in a few States; its public health benefit is only realized by emissions reductions which would not otherwise have occurred (that is, voluntary reductions) between now and the time that MACT standards are effective for the sources that take advantage of this option. It has the potential for substantial benefit and the Administrator should implement the authority to encourage the broadest possible participation.

Owners and operators have an incentive to use this option as it allows companies greater flexibility to choose the means by which they will reduce their air toxics emissions and to do it earlier, rather than wait for prescribed standards which must be installed on a regulatory schedule.

Considering that many firms handling substantial quantities of hazardous materials took significant actions in the post-Bhopal period to reduce emissions and the risk of accidents, the base year used for determining the 90 percent reduction may be as early as 1985, the first year after that event. This provision will assure the facilities that have voluntarily changed processes or installed technology that the approach they have selected to achieve substantial reductions will not be overturned by MACT standards imposed several years later. Information collected for compliance with the reporting requirements of section 313 of the Emergency Planning and Community Right-to-Know Act may be used to establish base year emissions. The reductions must be achieved from actual levels and not from levels contained in permits or calculated from other allowable limitations. Reductions may be calculated for the entire stream of hazardous air pollutants emitted by the plant (with an exception for the extremely potent toxicants including dioxins and furans), but only reductions in emissions of hazardous air pollutants (and not reductions in other VOC or particulate emissions) may be considered.

As a further condition on the exemption from the MACT standard, the emissions limitation which results in a 90 percent reduction must be established as an enforceable limitation in a permit issued to the source. Other conditions of the permit shall be governed by the provisions of section 112(j). The exemption does not include an exemption from any standard which may be established under subsections (f) or (g) to eliminate "residual risks".

Residual Risk.—Hazardous air pollutants may continue to impose significant adverse effects on public health and the environment, even after the technology-based standards for major and area sources authorized by section 112(d) are fully implemented. By their very nature, technology standards do not assure that all health and environmental concerns will be addressed, because those concerns are given no expression in the identification of emission limitations which reflect maximum achievable control technology taking costs into account. Furthermore, for many of the pollutants, and especially the carcinogens, there is no level of exposure which is "safe". Since even the maximum achievable controls will not eliminate all exposure to these air pollutants, the risks which remain after the program established by section 112(d) has been implemented must be considered. This set of concerns has come to be called "residual risk" in the debate on air toxics control legislation.

Two different strategies for dealing with these residual risks have been proposed. The legislation offered by the President (S. 1490) would give the Administrator of the Environmental Protection Agency wide latitude to determine which residual risks were of concern and warrant further regulation. Any controls to be imposed would be based on a regulatory standard authorizing the Administrator to eliminate "unreasonable risks". This standard calls for a balancing of the adverse health effects (the Administration bill does not provide for the consideration of environmental concerns) which may be caused by the hazardous air pollutants emitted from sources in a category after technology controls have been implemented against the costs that would be imposed (both to the regulated entity and to society as a whole) by further reducing emissions from the sources.

The reported legislation takes a different approach to the problem of residual risks. It requires the Administrator to define emissions levels for sources in each category listed pursuant to section 112(c) that would eliminate all adverse health and environmental affects associated with emissions from the sources in a category. Again, for those pollutants like carcinogens for which a "safe" level of exposure cannot be determined, it may not be feasible to eliminate all risks of concern. In the alternative, the legislation identifies lifetime risks of cancer exceeding 1-in-1,000,000 which may be experienced by the individual most exposed to emissions from a source in the category as the "adverse health effect" which is to be eliminated by residual risk standards.

The Administrator is to compare the emissions limitation which would eliminate the adverse health and environmental effects which may be caused by a source category with the MACT emissions limitation which is in place under section 112(d). If the technology standard allows emissions which may be associated with adverse effects, the Administrator has a non-discretionary duty to impose further regulation.

The residual risk regime proposed in the bill returns to questions of cost and feasibility only after a protective health and environmental standard has been defined. The amendments do not call for a simultaneous balancing of costs and benefits by the Administrator, but rather require a sequential set of determinations tied to more objective, and reviewable, rules for decision.

If the emissions limitation which eliminates adverse effects is necessary to protect against a health effect for which a "safe" threshold of exposure can be established, then the limitation is to be promulgated as a standard which protects against the occurrence of the effect with an ample margin of safety. And the standard is to be implemented in the same way as a standard promulgated under section 112(d), immediately for new sources and within three years for existing sources. No consideration of cost or other factors is to be included in setting or enforcing the standard.

For carcinogens, a somewhat different scheme is established. The Administrator is to promulgate two emissions limitations applicable to sources in the category. One is to be set at a level which, at a minimum, eliminates all lifetime risks of carcinogenic effects greater than 1-in-1,000,000 to the individual in the population who is most exposed to emissions of the carcinogenic pollutant from a source in the category. Considering the nature of the potential cancer risk which is reflected in the concept of a lifetime risk to the maximally exposed individual (MEI) and the economic and social consequences of imposing an absolute limitation at 1-in-1,000,000 in every case, the legislation also requires the promulgation of a less stringent standard reflecting a lifetime risk of 1-in-1,000,000 to the MEI. This less stringent standard was selected (and is written into the statutory language) in the context of the risk assessment parameters that the air program now employs. It recognizes the conservative nature of the underlying assumptions and is established with the expectation that the use of upper bound risks to the most exposed individual will continue to be the point of reference for risk management decisions taken in the air program.

Generally, reducing carcinogenic effects for the whole population to levels below 1-in-1,000,000 (and not just for the average person in the population) from any one category of sources is the appropriate goal. However. the risk assessment methodology which is currently employed by the Agency to define risks for the MEI from air pollution contains a series of conservative assumptions and built-in safety factors which allow room for the consideration of other factors when setting an upper bound on risk in this particular case. Rules for inference and decision followed in other programs using risk assessment at EPA and at other agencies are much less conservative and the decision to include a "1-in-10,000" standard as an upper bound here in no way implies that a similar choice would be warranted or acceptable in other cases.

The sequence of determinations does not, however, begin at the upper boundary. Every source in the category that can comply with the 1-in-1,000,000 standard must do so. Case-by-case exceptions to the 1-in-1,000,000 standard may be granted by the State or by EPA for existing sources on a showing (by the owner or operator of the source producing information which is specific to the source) that the source cannot comply with the standard using all available technologies and operational controls.

Consideration of cost is of course implicit in the term "available". Controls which are so expensive that they force closure of the source or would severely impair its continuation as an economic entity are not "available". A similar standard has recently been implemented by the Agency as a part of its "top-notch" approach to BACT determinations in the PSD program. The owner or operator of the source must show that compliance with the emission limitation which eliminates a 1-in-1,000,000 lifetime risk of cancer to the MEI (as opposed to the use of a particular technology as applies in the BACT case) is infeasible before an exception can be granted. An exception of this type is not available for new sources.

The exception is temporary and may not last for a period longer than the five-year period of the operating permit which is held by the source. The exception may be sought and granted during the subsequent permit period, but only if owner or operator of the source makes a new showing. The exception may also be made conditional upon an agreement by the owner of the source to conduct research and development with respect to new or unproven control technology at the source or to contribute to efforts being made by other sources in the category to develop and demonstrate such technologies.

During the period of any exception, the owner or operator of the source is to employ all technology and controls including process modifications and materials substitution which may be used to reduce emissions from the source. In most cases this will require compliance with an emissions limitation more stringent than that associated with the maximum achievable control technology. (Nothing in section 112(i)(4)(A) is to be interpreted or applied to authorize an exception for the source from a standard which is applicable under section 112(d)).

In addition to the requirement that all available technologies and operational controls be employed to reduce emissions during the time that the sources is allowed to exceed the "1-in-1,000,000" emission limitation established under section 112(f)(1)(B), emissions from the source are also subject to the second, "1-in-10,000" standard which the Administrator is to promulgate for source categories emitting known, probable or possible human carcinogens.

A renewable exception to the emission limitation set at this upper bound (a lifetime risk of 1-in-10,000 to the most exposed individual) is not available. Existing sources must comply with the standard within three years. (It is not relevant in the case of new sources as they must comply with the standard issued under section 112(f)(1)(B).) However, the compliance deadline can be extended for one five-year period if the source demonstrates that compliance at any earlier date will require the source to shutdown.

It may be that some sources that by definition present a serious health risk will be closed as the result of emissions limitations imposed under the revised section 112. However, the bill provides generous compliance schedules and a phased program (technology-based standards followed by residual risk reductions) which should allow most sources to make the investments, process modifications and materials substitutions which can avoid that result. The first standards under section 112(d) are to be issued not later than two years after enactment. Existing sources will have three years to comply with those standards. EPA will not complete the residual risk determination for the source category until two years after that. There is a further three-year compliance period for the residual risk standard. A five-year extension for sources that would be forced to shutdown by the "1-in-10,000" standard defining the upper boundary on acceptable risk. That sequence of steps covers a period of fifteen years from the date of enactment of the legislation to the date of compliance with the residual risk standard.

In comparing the residual risk regime established by the reported legislation with that proposed by the Administration, several points need to be considered.

First, the "unreasonable risk" standard which the President has proposed is now found in two other statutes administered by the Environmental Protection Agency, the Toxic Substances Control Act (TSCA) and the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). Neither has worked well.

TSCA was enacted in 1976 and in its fourteen-year history has resulted in the regulation of one pollutant (asbestos) under the "unreasonable risk" authorities and in that case the regulation is yet to be implemented or litigated.

The difficulties in making risk balancing decisions under FIFRA periodically make national headlines (such as the pesticide EDB and Alar) and recently the President proposed legislation which would put more explicit risk-based boundaries on the competing considerations which must be weighed. At the President's urging FIFRA is moving away from the completely discretionary "unreasonable risk regime" and in the direction of the standard-setting structure described here. "Unreasonable risk" has not served as solid foundation for health protection in the statutes where it is already explicit.

A second dimension to the comparison between the residual risk program in the Administration bill and the one established here may be made by considering specific air pollution control decisions that have involved similar questions. In 1987 the D.C. Circuit Court of Appeals in *NRDC* v. *EPA* (824 F.2nd 1146) authorized the Agency to consider questions of acceptable risk in determining the "safe" level of exposure to hazardous air pollutants and mandated that the Agency set standards for four source categories of benzene emissions, a known human carcinogen. The court established no upper limit on the risks it would find acceptable; and in fact, indicated that determining acceptable risk was the kind of decision that should be left to an expert Agency. By a memorandum issued in April 1988, the then-Administrator, Lee M. Thomas, announced his proposed determination that existing risks presented by all of the source categories were acceptable (including a lifetime risk of $6\times{}^{-3}10^{-3}$ to the maximum exposed individual (MEI) for coke byproduct plants) and that no further margin of safety was indicated.

This preliminary determination to accept a risk of an additional cancer for each of the 176 persons exposed was widely opposed. As a result, the Agency pulled back and announced and invited comment upon four regulatory options that reflected various approaches to setting an upper bound. In July of 1989 the Agency promulgated a final emissions limitation for coke byproduct plants which reflects a lifetime risk of 2×10^{-4} for the MEI, a substantially smaller risk than Mr. Thomas originally defined as acceptable when determining an ample margin of safety, but somewhat more than would be allowed under the reported legislation.

The details of this case have been provided because they shed considerable light on the actual considerations which may prevail under any residual risk regime which may be added to section 112. The approach taken in the legislation has been criticized because it establishes "bright lines" to guide the regulatory process. The critics contend that the science for assessing these risk is yet too new to be locked in on absolute limits. The critics urge discretion for the Administrator to weigh a series of factors in determining the level at which acceptable risks might be set, including the consideration of the total cancer incidence associated with the emissions and the quality of the data underlying the risk assessment, including the pollutants potency and human exposure.

Although these comments raise legitimate concerns that must be kept in mind in the design of the overall regime, they do not describe the decision-making process which the Agency used to arriver at the coke byproduct plant emissions limitation. After the original determination to forgo further control was overturned, the Agency selected a control technology that was thought to be available and feasible for these plants, collected data on the emissions rates which would result from application of the technology, and as a last step before the *Federal Register* calculated the lifetime risk that would be experienced by the MEI if that technology were required. When that risk was found to be 2×10^{-4}, the Agency added some post hoc justification in risk assessment jargon for the proposed rule noting that the assumptions were conservative and the date was less than certain. But it was a technology-driven standard.

Forced by a court decision to establish a NESHAP for coke byproduct plants and checked by public opinion when it tried to promulgate a standard beyond the traditional definition of acceptable risk, the Agency followed the technology-based path and justified its selection with risk assessment qualifiers after the fact. The "bright light" boundaries on acceptable risk contained in this legislation are necessary to bring public health considerations into the standard-setting process at the beginning.

In the case of cancer-causing air pollutants, the "unreasonable risk" standard proposed in the President's bill cannot serve as a successful foundation for a residual risk program. The public health consequences of substances which express their toxic potential only after long periods of chronic exposure will not be given sufficient weight in the regulatory process when they must be balanced against the present day costs of pollution control and its other economic consequences.

Work practice standards and other requirements.—Generally, the requirements of section 112 of the Clean Air Act, both current law and as amended by the bill, are implemented by the promulgation of numerical emissions standards applicable to point sources of release (such as stacks, vents, pipes, etc.) from stationary sources of the listed air pollutants. However, in some cases regulation in this form would not be effective or appropriate for significant source categories. For instance, emissions of asbestos fibers from construction or demolition sites cannot be controlled or even measured by focusing on a point source of emissions. To assure that adequate control is, nevertheless, achieved, it is in some cases possible to prescribe the use of specific equipment or procedures in the design of a facility or conduct of an activity. In the 1977 amendments to the Clean Air Act (and specifically in response to a court case nullifying regulations for the non-point release of asbestos fibers because the requirements were not expressed as emissions standards), the Congress authorized the use of other regulatory requirements including design, equipment, work practice or operational standards as an alternative to emissions standards to carry out the objectives of section 112. These amendments add operator training requirements to that list.

The purpose of the amendments in the new section 112(h) is to assure that these alternative forms of control are available to the Agency as it implements the new authority to set technology-based standards for major sources and area sources of hazardous air pollutants. As under current law, the Administrator may set design, equipment, work practice, or operational standards in lieu of an emission standard only when the latter is "not feasible" as defined in paragraph (1)(B) of section 112(h). In determining whether an emission standard is "not feasible" the Administrator may not consider any factor other than those specifically mentioned in that paragraph.

The authority to establish alternative requirements which will "protect public health from such pollutant or pollutants with an ample margin of safety" (the standard of protection under current law) is modified. The amendment adds authority to use these alternative control measures to achieve the degree of protection required by standards issued under the new section 112(d) which describes the degree of control to be incorporated in technology-based standards for major sources.

Paragraph (3) of section 112(h), as amended, requires the Administrator to establish leak prevention, detection and correction requirements as part of the emissions standard for each category of sources regulated under section 112. This paragraph covers both equipment leaks (formerly called "fugitive emissions" by EPA) and emissions from storage tanks. Equipment leaks are responsible for the largest percentage of the emissions in many facilities handling toxic chemicals. In some cases, the Agency has defined equipment leaks and storage tanks as separate source categories. In other cases, EPA considers equipment leaks and storage tanks as part of the basic units regulated. The provision included here will require that emissions standards address all of the emissions within the facility, whether from stacks, vents or other process units and from equipment leaks and storage tanks.

EPA has issued a generic equipment leak standard which can be applied to leaks of hazardous air pollutants from oil refineries, chemical plants, and other sources. That regulation does not necessarily reflect the maximum degree of emissions reduction which is achievable. For example, it does not require the use of valves which the Agency has described as "leak-free" or pumps with double seals, despite the fact that both types of equipment are commercially available and have been demonstrated in practice. In addition, the current standard does not require preventive maintenance and repair practices that also have been demonstrated in practice. Standards meeting the test of section 112(h)(3) will require these and other control technologies.

The amendments authorize the Administrator to establish annual audit and safety inspection requirements as part of the leak prevention, detection and correction standards. Such requirements shall be included in each emission standard unless there is good reason for not requiring such audits and inspections. The annual audit and inspection is intended to be an especially thorough examination of the facility, above-and-beyond the care required for day-to-day operations. The objective of the audit and inspection is to locate and correct all leaks and conditions that could give rise to either routine or episodic releases in the future. The results of these audits and inspections and any other safety inspections of a facility subject to an emissions standard are to be available to the Agency, the State in which the facility is located and to the public, subject to the confidential business information provisions of the Emergency Planning and Community Right-to-Know Act of 1986.

The new section 112(h)(2) is intended to supplement the Administrator's authority under section 114 of the Act to obtain information necessary to develop or assure compliance with emissions standards for air pollutants and requirements to prevent the accidental release of extremely hazardous substances pursuant to section 129. The Administrator may require emissions or ambient air monitoring when data is needed to determine whether a substance or source category should be listed or regulated under subsections (d), (f), or (g) of section 112 or section 129, aswell as when data is needed during the development of a standard. Data and reports developed pursuant to this authority shall be publicly available to the same extent as data collected under section 114.

In addition, the Administrator is to use this authority and the authority of section 112(j) (with respect to permit requirements) and of section 114 to establish emissions monitoring, record-keeping, and reporting requirements sufficient to assure the enforcement of standards promulgated under this section. It is essential for the Administrator to establish these requirements in order to assure that compliance with emission standards is sustained continuously. This is particularly important where the performance of a control measure depends on proper operation or maintenance, or where a source might continue operating despite the breakdown or malfunction of control equipment.

The authorities created here are also available to the State and local pollution control agencies conducting approved programs pursuant to section 112(1).

The authority to require monitoring may, of course, be used with respect to hazardous air pollutants or extremely hazardous substances not listed and regardless of any threshold quantity which may be established at the time of listing, since it may be used for the purpose of developing regulations or conducting studies.

Leak detection is more than a monitoring system for compliance with standards and requirements. It may function as an integral part of accident prevention and mitigation strategies. However, leak detection is a protection measure that comes into play only after a release has commenced. Where releases to the environment may be small and continue over a long period of time before significant environmental damage is done (gasoline leaks from corroding underground storage tanks, for instance) leak detection would play a larger role in the overall prevention and protection scheme. Where events may be sudden and catastrophic, as will generally be the case with extremely hazardous substances listed pursuant to subsection 129, leak detection systems should not be relied upon as the principal means of protecting public health and the environment.

Monitoring, audit, safety inspection and leak detection requirements imposed pursuant to section 112(h) may be enforced by the Administrator under section 113 of the Clean Air Act as if they were emissions limitations under this section.

Permit program.—Emissions standards and other requirements (for instance monitoring, leak detection, and work practice standards) imposed on sources under this section are to be implemented through per-construction and operating permits.

The permit requirement is effective on the date of enactment and applies to standards which have been promulgated under section 112 previous to the enactment of this legislation. Thus, regulated sources of the seven pollutants for which a national emissions standard for hazardous air pollution (NESHAP) have been promulgated will be subject to an immediate permit requirement. This obligation can be satisfied, immediately, by the submission of a certification that the facility is in compliance with the NESHAP. The certification will result in the issuance of a temporary operating permit to the facility. Sources which are not in compliance with the NESHAP will not be able to make the certification. Certifications may be made to States which have delegated authority to enforce NESHAPs or to the Administrator. Existing sources in categories for which NESHAPs have only recently been promulgated are not subject to the permit requirement until the date on which the NESHAP is applicable to that source.

In the case of most other sources it is expected that the first new standards under the amended section 112 will be issued not later than 24 months after enactment of the bill, and it is not until a standard applicable to a source is promulgated that the source becomes subject to the permit requirement. This gives the Administrator and the States time to establish a permit program for hazardous air pollutants. The Administrator is to promulgate regulations covering permit programs as described below not later than 12 months after enactment.

The permit requirement applies to all sources which are subject to a standard under this section which would include area sources for which a MACT or GACT standard has been established.

Permit applications are to be accompanied by a one-time fee sufficient to offset all of the direct and indirect costs associated with processing the permit. For larger sources, on site inspection and other work will be required so fees, in some cases, may be substantial. The program is also to include an annual fee to be imposed on permitted sources which will collect aggregate revenues sufficient to offset all of the costs attributable to the "major source" provisions of an air toxics program within the State (whether administered by EPA or the State). Program elements supported by the annual fees may include, but are not limited to, regulatory development, monitoring, the preparation of emissions inventories, modeling, enforcement and all of the indirect costs associated with these activities.

Fees imposed on permitted sources are not to cover program elements for areas sources (which have not been listed by the Administrator and thus are not subject to permit requirements), mobile source programs, or accident prevention programs. States may impose fees in addition to those required in the program regulations promulgated by the Administrator, but the Administrator shall not approve the air toxics program of any State under subsection (1), if those fees are used for purposes other than developing and implementing programs to control hazardous air pollutants. On the other hand, proposed State programs with fees insufficient to completely offset the cost of the "stationary source" portion of the program shall also not be approved.

States should be given latitude in structuring the annual fees including the basis for the assessment (volume of emissions, toxicity of pollutants, industrial categories, etc.) and the time and manner of collecting the fees. (For instance, they may be paid at the time the permit is issued and cover the five-period until the permit is renewed).

Fees paid to the Administrator under this subsection are to placed in a special fund of the Treasury for appropriation to the Agency to carry out the programs under this section.

Permits are also to include enforceable requirements for the self-monitoring of emissions, including continuous emissions monitoring unless the Administrator has determined that continuous monitoring methods are not available for the pollutant or source category. Owners and operators of permitted facilities are to report the results of monitoring periodically (not less often than annually) and are to note any cases of noncompliance in such reports. These reports are to be publicly available and will facilitate enforcement actions against those not in compliance with emissions limitations.

Permits are to be for a period of not more than five years and may be reopened or terminated for cause including a modification of a standard imposing more stringent limitations on a source than are contained in the permit. Permits may only be issued after the State agency has provided notice and opportunity for comment on the permit application or the permit which the State proposes to issue to the source. EPA may comment on any permit application or proposed permit and may veto its issuance. The Agency has 60 days from the date that it receives the permit application or proposal to register its objection which will include a description of the conditions which, if contained in the permit, would remove the Agency's objection to its issuance. If the State has not modified the proposed permit within 90 days to reflect these conditions, authority to issue the permit is transferred to the Administrator.

States seeking to operate permit programs pursuant to subsections (j) and (l) of section 112 must demonstrate that they have adequate personnel and resources to carry out the program and adequate authority to ensure compliance with permit requirements.

Area source program.—Through a series of studies conducted earlier this decade, the Environmental Protection Agency has determined that only a part of the air toxics problem results from the large chemical and industrial facilities which one normally associates with hazardous air pollutants. A substantial portion of the air toxics problem may, in fact, be caused by much smaller, diverse sources of these air pollutants. The so-called "area sources" include wood stoves, apartment building boilers and other small combustion units, dry cleaners, service stations, publicly owned wastewater treatment works, drinking water supply systems, solid and hazardous waste landfills, pesticide applications and automobiles, trucks and buses.

In its air toxics strategy proposed in 1985 the Agency set forth the beginning elements of a national program to address these area sources of harmful pollutants. In many cases, the authorities of section 112 (promulgation of emissions standards or alternative design and work practices standards) would have been cumbersome tools, at best, to achieve reductions in pollution from these sources. The Agency, therefore, turned to other authorities in the Clean Air Act (new source performance standards and mobile source tailpipe standards) and other statutes (the Toxic Substances Control Act, principally) to develop the needed tools. Although only one of the strategies announced in 1985 has been implemented to date (new source performance standards for wood stoves), many promising steps were suggested. The new section 112(k) proposed in this legislation builds on the Agency's plans to address this portion of the air toxics problem.

Three figures taken from a recent EPA Report ("Cancer Risk from Outdoor Exposure to Air Toxics," September, 1989) give quantitative dimension to the area source air toxics problem. Figure II-

5 shows additive lifetime cancer risks from hazardous air pollutants for four cities ranging from 3 in 10,000 in Boston to 3.2 in 1000 in Chicago (3 of every 1000 persons living a whole lifetime in Chicago would be expected to die of cancers caused by hazardous air pollutants). It is important to note that these additive risks are for only a handful of the scores of toxic pollutants that can be found in urban airsheds. Figure III-6 reports comparable information for eleven other cities.

Figure III-7 lists projected annual national cancer cases attributable to various area and industrial source categories of hazardous air pollutants. It demonstrates that a large portion (as much as 75 percent) of the cancer incidence is attributable to area sources. This is to be expected since the number of persons exposed to area source emissions is very high. On the other hand, risks to maximally exposed individuals can be much higher (greater than 1-in-100) for the point source industiral categories than for the commercial and mobile sources that contribute to areawide concentrations.

FIGURE III-5

SUMMARY OF ADDITIVE LIFETIME INDIVIDUAL RISKS FOR SELECTED CITIES

City	Additive individual lifetime risk	Number of pollutants	Major pollutants contributing to additive lifetime risk
Los Angeles	6.6×10^{-4}	17	Formaldehyde, PIC
Baton Rouge	3.8×10^{-4}	16	Ethylene Dichloride, PIC
Boston	3.0×10^{-4}	11	PIC, Chromium (hexavalent)
Chicago	3.2×10^{-3}	14	PIC, Formaldehyde

Source: Ambient Air Quality Study.

FIGURE III-6

AREAWIDE LIFETIME INDIVIDUAL RISKS FOR SELECTED CITIES

City/locale	Lifetime individual risk	Number of pollutants	Major pollutants contributors to individual risk [1]
Philadelphia	1.1×10^{-4}	7	Benzene, carbon tet. 1, 2 dichloropropane
Santa Clara	4×10^{-5}	—	Carbon tetrachloride
Southeast Chicago	2.2×10^{-3}	30	Coke oven emissions, Cr+6
City A	1.4×10^{-4}	20	Formaldehyde, PIC, 1,3-butadiene
City B	4.3×10^{-4}	20	1,3-butadiene, PIC, Cr+6, formaldehyde
City C	2.0×10^{-4}	20	1,3-butadiene, formaldehyde
City D	7.0×10^{-4}	20	PIC, 1-3-butadiene, Cr+6
City E	2.7×10^{-4}	20	PIC, formaldehyde, Cr+6
Kanawha Valley	10^{-3} to 10^{-6}	18	Ethylene oxide, 1,3-butadiene
Baltimore	1.3×10^{-5} to 3.2×10^{-5}	9	Benzene, Cr+6
South Coast	1.2×10^{-4} to 3.1×10^{-4}	13	Benzene, Cr+6

[1] Cr+6 = hexavalent chromium. Carbon tet. = carbon tetrachloride.

FIGURE III-7

SUMMARY OF ESTIMATED CANCER CASES BASED ON MODELED AMBIENT CONCENTRATIONS, BY SOURCE CATEGORY

Source category	Annual cancer cases	Percent of total	Principal pollutants
1. Motor Vehicles	769–1,461	(53–57)	PIC, 1,3-butadiene
2. Secondary Formaldehyde	106–154	(7.4–6.1)	Formaldehyde
3. Electroplating	120	(8.3–4.7)	Hexavalent Chromium
4. TSDFs	48–140	(3.3–5.5)	Dioxin
5. Woodsmoke	89	(6.2–3.5)	PIC
6. Asbestos, Demolition	81	(5.6–3.2)	Asbestos
7. Unspecified (point)	25–90	(1,7–3.5)	Arsenic, formaldehyde
8. Cooling Towers	0.01–111	(0.0–4.4)	Hexavalent Chromium
9. Gasoline Marketing	22–75	(1.5–2.9)	Gasoline Vapors, Benzene
10. Solvent Use/Degreasing	22–36	(1.5–1.4)	Perchloroethylene, Methylene Chloride
11. PVC/EDC/Vinyl Chloride	19	(1.3–0.7)	Vinyl chloride
12. Iron and Steel	17	(1.2–0.7)	Coke Oven Emissions, Benzene, PIC
13. Unspecified (area)	14	(1.0–0.6)	Carbon tetrachloride
14. POTWs	13	(0.9–0.5)	Ethylene dibromide, vinyl chloride
15. Sewage Sludge Incinerators	13	(0.9–0.5)	Cadmium, Vinyl Chloride
16. Coal and Oil Combustion	11–15	(0.8–0.6)	Arsenic
17. Municipal Waste Combustors	2–20	(0.1–0.8)	Dioxin
18. Petroleum Refineries	8–14	(0.6–0.5)	Gasoline Vapors, Formaldehyde
19. 1,3-Butadiene Production	10	(0.7–0.4)	1,3-butadiene
20. Styrene-butadiene Rubber Production	10	(0.7–0.4)	1,3-butadiene
21. Smelters	3–4	(0.2–0.2)	Formaldehyde
22. Commercial Sterilization/Hospitals	3–4	(0.2–0.2)	Ethylene Oxide
23. Pesticide Production/Usage	3.4	(0.2–0.1)	Benzene
24. Drycleaning	3	(0.2–0.1)	Perchloroethylene
25. Chemical Manufacturing (unspecified)	2.3	(0.2–0.09)	Acrylonitrile, Formaldehyde
26. Pulp and Paper Manufacturing	2	(0.1–0.08)	Chloroform
27. Drinking Water	2	(0.1–0.08)	Chloroform
28. Ethylene Dibromide Production	1.6	(0.1–0.06)	Ethylene Dibromide
29. Polybutadiene Production	1.2	(0.08–0.05)	1,3-butadiene
30. Ethylene Oxide Production	1.2	(0.08–0.05)	Ethylene Oxide
31. Ethylene Dichloride Production	1.2	(0.08–0.05)	Ethylene Dichloride, Trichloroethylene
32. Waste Oil Burning	0.6	(0.04–0.02)	Arsenic
33. Chlorohydrocarbon prod.	0.6	(0.04–0.02)	Trichloroethylene
34. Asbestos Manufacturing	0.5	(0.04–0.02)	Asbestos
35. Asbestos Renovation	0.4	(0.03–0.02)	Asbestos
36. Glass Manufacturing	0.4	(0.03–0.02)	Arsenic
37. Hazardous Waste Combustors	0.3	(0.02–0.01)	Hexavalent Chromium
38. Paint Stripping	0.3	(0.02–0.01)	Trichloroethylene
39. Pharmaceutical Manufacturing	0.2–0.4	(0.01–0.02)	Chloroform
40. Benzene Fugitives	0.2	(0.01–0.01)	Benzene
41. Nitrile Elastomer Production	0.16	(<0.01)	Acrylonitrile
42. ABS/SAN Production	0.13	(<0.01)	Acrylonitrile
43. Asbestos Fabricating	0.13	(<0.01)	Asbestos
44. Benzene Storage	0.1	(<0.01)	Benzene
45. Other	13	(0.9–0.5)	Radon
Total	1,440-2,545		

Note: Values in this figure are not absolute predictions of cancer occurrence and are intended to be used in a relative sense only. The dose-response relationships and exposure assumptions have a conservative bias, but omissions due to uncharacterized pollutants (either directly emitted or secondarily formed) and emission sources, and the lack of knowledge of total risk from multipollutant exposures will offset this bias to an unknown extent.

Section 112(k) added to the Clean Air Act by this legislation is intended to achieve substantial reductions in the health risks caused by area sources of hazardous air pollutants.

Section 112(k) contains two Congressional findings: (1) emissions of hazardous air pollutants from area sources may individually or in the aggregate present a significant threat to public health in urban areas; and (2) ambient concentrations of air toxics characteristic of urban areas should be substantially reduced.

The purpose of the area source control program added by this legislation is to reduce emissions and reduce health risks. The bill adopts the goal which was announced by the President when he released his clean air proposal in June of 1989:

> The President's plan will require factories and plants emitting toxic compounds into the air to employ the best technology currently available in order to achieve in the near term a cut estimated at 75 to 90 percent in pollutants suspected of causing cancer. Taken together with efforts to reduce cancer-causing emissions from cars and trucks, it is estimated that the plan will eliminate in its first phase over three-fourths of the annual cancer deaths that air toxics are suspected of causing. (White House, Fact Sheet: President Bush's Clean Air Plan, June 12, 1989)

Since a substantial portion of the cancer cases attributable to air toxics are caused by emissions from area sources, any program designed to meet the objectives which the President outlined must contain a comprehensive and carefully crafted program to control emissions from these small and numerous sources of pollution.

The strategy outlined in section 112(k) begins with a twopart research program—one part assigned to EPA and one part assigned to State and local government. EPA is to broadly characterize the urban air toxics problem by conducting ambient monitoring for a broad range of pollutants in a representative group of urban areas. Studies reported to date typically analyze emissions or ambient data for a small number of pollutants. The true scope of the problem cannot be determined from these studies. Nor do we know how that problem varies across communities with geography, climate and socio-economic conditions. Sampling for the broadest range of pollutants (given limitations of methods of speciation) in 25 to 35 cities would be appropriate.

EPA is also to characterize the sources of the pollutant loadings measured with special emphasis on determining the contribution of various area source categories to urban ambient concentrations. Finally, EPA is to study the effects of atmospheric processes on the transformation of air pollutants and the resulting health impacts that may be expected in urban areas. Included in this portion of the study should be estimates for secondary exposure to hazardous air pollutants released into the urban environment. In some recent studies, ambient concentrations of some pollutants were much higher than was expected from emissions modeling. The pollutants at issue were the toxic metals which are not oxidized in the atmosphere, but stay in the environment for long periods, to be re-entrained in urban air by natural and anthropogenic events.

EPA is to report on this research three years after the date of enactment of the legislation.

Beginning 18 months after enactment of section 112(k) all urban communities in the U.S. with populations above 250,000 are to commence air toxics monitoring programs with the purpose of characterizing air quality in the community for the 15 to 25 hazardous air pollutants which have been identified in studies and investigations as causing the greatest threat to public health from area source emissions. The Administrator is to prescribe the list of pollutants for which monitoring will be conducted and may provide for monitoring of different pollutants in different communities if there are objective reasons for doing so.

There are approximately 150 Metropolitan Statistical Areas with a population greater than 250,000. Because some of these communities cover a large geographic area and because ambient concentrations of air toxics can vary significantly by location, season and time of the day, mobile monitoring systems should be employed. Continuous monitoring at stationary sites (which can cost as much as $20,000 per site) is not required. More useful information would likely be collected by sophisticated mobile monitoring equipment that served several communities in a geographic region. Funds authorized to be appropriated to the Administrator to carry out this section can be used to design, purchase and make available such equipment. However, the responsibility to conduct monitoring as required here is imposed on States receiving grants under section 105 and the absence of Federal funds to support these monitoring programs will not diminish the obligation imposed on States to conduct the monitoring required.

The Administrator may allow the monitoring program to be phased in over a three-year period. The Administrator may also authorize a reduction in the level of effort for communities which have fully characterized the quality of their airsheds with respect to the prescribed pollutants and found that ambient levels are consistently below levels which would be a public health concern. The Administrator may also require that communities with less than 250,000 persons participate in the program.

Data collected by the States and local air pollution authorities pursuant to these monitoring requirements are to be presented to the public in hearings and in a biennial report transmitted to the Administrator.

Based on the information which is collected by the Administrator and by State and local air pollution control agencies carrying out the research programs of section 112(k) and other studies and information which may be available, the Administrator is to prepare a national urban air toxics strategy. The strategy is to be designed to meet the purposes discussed above, including reductions in emissions of 75 to 90 percent and reduction in cancer cases attributable to exposure to air toxics by not less than 75 percent.

The Administrator is to hold hearings on the strategy and is to transmit the plan to the Congress not later than five years after the date of enactment of subsection 112(k).

As part of the strategy, the Administrator is to identify not less than ten air pollutants which present the greatest threat to public health as the result of emissions from area sources. These pollutants are to be added to the list established by section 112(b), if they are not already listed. In addition, the Administrator is to list under section 112(c) categories and subcategories of these pollutants which, in the aggregate, account for not less than 90 percent of the emissions of each of the identified pollutants. These listings shall occur no later than the time that the report is transmitted to the Congress.

Listed source categories shall be subject to a standard (which may be an emissions limitation or other requirement) under section 112(d) (or section 112(h), as appropriate) or to an action under subsection (k) of section 112. Actions under section 112(k) are essentially referrals to other authorities administered by the Agency that in individual cases may be more appropriate than standards under section 112 for control of emissions from area sources.

The Administrator is authorized to use a wide variety of authorities to achieve the mandated reductions. These authorities include, but are not limited to, emissions standards, leak prevention requirements and design and work practice requirements under section 112 of the Clean Air Act; new source performance standards under section 111 of the Act; mobile source and fuel regulations under title II of the Act; areawide strategies including transportation control measures developed under section 110 of the Act; section 6 of the Toxic Substances Control Act; and the available authorities of the Resource Conservation and Recovery Act and the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA).

No requirement imposed in the area source provisions of this legislation alters the character of these other authorities. For instance, nothing in this provision would affect the risk balancing decision-making process which is established by FIFRA for the regulation of pesticides. The necessary justification for control of the volatility of pesticide products or of the method of their storage and application under FIFRA would not be affected by the amendments in this paragraph. Pesticide emissions may, of course, be subject to regulation pursuant to the technology-based standards under section 112(d) or regulation under other provisions of the Clean Air Act.

The strategy shall also include a schedule for implementing the various emissions reduction measures which are identified. The strategy shall assure that all sources subject to a requirement, be in compliance with that requirement not later than nine years after the date of enactment of the legislation. The aggregate effect of this program should be a reduction in emissions of air toxics from area sources to levels 75–90 percent below those prevailing today and an associated reduction of 75 percent in the number of cancer cases attributable to toxic emissions from area sources not later than the ninth year after enactment of section 112(k).

The Administrator is also to: 1) report to the Congress on implementation of this program eight and 10 years after the enactment of section 112(k); 2) support areawide toxics strategies developed by State and local governments through grants and technical assistance; and 3) report to the Congress on the health impacts of mobile source benzene emissions, including consideration of the fuel and vehicle-based strategies which would reduce significantly public health risks associated with such emissions.

The area source program is not expected to be delegated in any way to State and local pollution control agencies. However, the Administrator may accomplish some portion of the national objective through milestones included in State and local program guidance, where appropriate.

Nothing in these provisions would authorize the regulation of mobile source emissions by State or local air pollution control authorities where that regulation would be prohibited by other provisions of the Act.

State programs.—Section 112(1) provides authority for States (and local air pollution control agencies) to submit programs for the implementation and enforcement of emissions standards issued under subsection (d), (f) or (g) of section 112 and the prevention and mitigation of accidental releases of extremely hazardous substances as provided in section 129. These authorities will greatly expand the role of State and local air pollution control agencies in the statutory programs to protect public health and the environment from the release (whether routinely or by accident) of toxic air pollutants. Under current law, the formal State role is limited to the enforcement of the handful of emissions standards which the Agency has promulgated for hazardous air pollutants.

Documents from the Agency indicate that 43 "States" have taken delegation for the enforcement of all NESHAPs, 12 have delegation activities underway, 3 have delegation for all standards except asbestos and 5 show that NESHAPs are not applicable to facilities in the State. This level of delegation reflects significant success in recent efforts to develop this element of State programs. Enforcement and implementation activities delegated under the program as modified by this legislation will also encourage comparable activity by the States for the technology-based standards issued pursuant to section 112(d) and the accident prevention and mitigation requirements which may be promulgated under section 129.

In actual practice, a few State and local governments have undertaken a far more wide-ranging set of activities, both on their own and in partnership with the Environmental Protection Agency. Building the capacity of State and local air programs to control the emission of toxic air pollutants was a principal focus of the Agency's 1985 air toxics strategy.

The modified section 112(1) provides for either complete or partial delegation of the Federal enforcement and implementation responsibilities. Partial delegation may entail only emissions standards for hazardous air pollutants or only the accident prevention and mitigation program. The Administrator shall not approve State programs that cover only some types of facilities or some pollutants within a larger area of activity.

This legislation does not authorize the Agency to "refer" toxic air pollutants to the States for the development of emissions standards and control programs as was proposed by the Agency in the case of acrylonitrile. The legislation does not contemplate a policy that relies upon State or local air pollution control agencies to set emissions standards for toxic air pollutants. In the case of acrylonitrile, which is routinely emitted by 25 facilities in 14 States producing substantial individual risks in local areas, the Administrator sought to avoid the need for a Federal standard by referring this problem to the States where the emitting facilities were located. It is not clear from the record before the Committee what action the States have taken to reduce emissions of acrylonitrile, but the referral process has been deleted by the Agency from its air toxics strategy (for lack of support at the State level) and is explicitly rejected by this legislation. Acrylontrile is listed among the twelve high-priority pollutants for which technology-based standards are to be promulgated by the Administrator within 24 months of enactment of the legislation.

The policy reflected here does not preclude a State from developing emissions standards for air pollutants or requirements to prevent the release of extremely hazardous substances not addressed by the Federal program. Federal funds may even be used to develop these standards and requirements. However, the Agency is not to avoid its responsibility to protect public health and the environment by referring substances of concern to States for regulation, nor is it to require standards for a particular pollutant as a precondition of funding state programs. Where a pollutant meets the criteria for listing and control under sections 112(b) or 129(c), the Administrator—and not the States—will fulfill the mandate in the law.

The Administrator is required to issue guidance on the development and implementation of State air toxics programs within 12 months of the date of enactment of this legislation. The Agency has provided preliminary guidance of this type in documents issued for use in State programs during each fiscal year. These documents will serve as a useful foundation for the formal guidance required here.

The guidance issued by the Administrator will stress two additional themes: (1) the issuance of permits to all stationary sources subject to an emissions standard under subsections (d), (f) or (g) of section 112; and (2) the registration of all facilities handling extremely hazardous substances listed pursuant to section 129 in more than the threshold quantities. The legislation provides detailed direction on the structure of the permit program in section 112(j), using the NPDES program implemented under the Clean Water Act as an appropriate model. In the absence of State permits, facilities subject to emissions standards under section 112 will require a permit issued by the Agency.

The guidance must also make provision for the development of "accident release" programs at the State level. As reflected in the new section 129, accident prevention capabilities will be a high priority in the air toxics program and, at a minimum, each State must include in its proposed program an element providing for the registration of facilities handling extremely hazardous substances in more than threshold quantities as listed pursuant to subsection 129. The State of New Jersey has developed a thorough registration program of this type pursuant to its Toxic Catastrophe Prevention Act which should be used as a model to develop the guidance required by this section.

One element of the program which was encouraged for the first time in the 1986 guidance document and which the Agency has built upon in the intervening years is the "high-risk point source review" program. Section 112(1) provides each State with the option to include the review of high-risk point sources within the program it proposes to the Agency.

In the process of screening pollutants and sources for the promulgation of NESHAPs, the Agency has performed risk assessments on more than 2500 point sources of air toxics. At about one quarter of these facilities there is a "hotspot" within the vicinity of the facility posing a lifetime cancer risk in excess of 1-in-10,000 (1×10^{-4}), considered a relatively high risk compared to other threats from environmental pollution.

In light of these comparisons, Agency guidance for State and local air toxics programs has encouraged review of high-risk sources in the absence (or in advance) of federally-promulgated NESHAPs.

To date federally-promoted initiatives have focused on the development of State capacity to conduct source-specific screening comparable to that conducted by the Agency during the development of a NESHAP and integration of this review program with other activities by the State with respect to the same source under section 110 or parts C or D of the Clean Air Act. This developing State capacity is supported by this legislation and may be used as a foundation for additional program elements including public hearings on high-risk point sources.

In fiscal year 1989, the Agency committed $400,000 in special grant funds to support high-risk point source review projects at 24 sites in 13 States. These funds were in addition to the approximately $1 million of section 105 funds which are used to support such efforts in each of the States. The program has been welcomed by the States and about one-half of the projects have led to measurable reductions in emissions.

To facilitate identification of high-risk point sources and the notification of potentially affected persons, EPA is to publish a list of point sources of toxic air pollutants (whether the pollutants of concern are listed pursuant to this section or not) known to the Agency as a high-risk sources. High-risk in this context shall be determined by the Administrator, but risks comparable to those noted above for the promoted initiatives over the past two fiscal years are within the range of concern.

The optional inclusion of a high-risk point source review in State programs does not in any way diminish the Administrator's responsibility to list and set standards for pollutants that meet the criteria for listing under sections 112(b) or 129(c).

The bill authorizes the National Air Toxics Information Clearinghouse which was inaugurated by the Agency in 1985 to support State and local programs to control non-criteria air pollutants. The Clearinghouse is intended to facilitate information exchange among State and local agencies, between EPA and State and local agencies, and to minimize duplication of effort. The Clearinghouse gathers and provides technical information to the States and consists of an on-line computerized data base (NATICH) which contains information on potentially toxic air pollutants, hard copy reports of information from the data base, several special reports, and a quarterly newsletter. Users (generally State and local air pollution control agencies) can directly query the data base or, if compatible equipment is not available, can obtain further assistance through EPA regional offices. The data base includes State and local contacts, acceptable ambient concentrations and standards, research information, permitting information, monitoring information, emissions inventories, source-specific risk assessments, and bibliographic information.

The bill also authorizes the establishment of a risk assessment clearinghouse. Here again, the legislation is explicitly authorizing an institution already in place. The Air Risk Information Center (or Air RISC) was established in 1988 to assist State and local air pollution control agencies and EPA regional offices with technical matters pertaining to health, exposure, and risk assessment for non-criteria air pollutants.

The Administrator is authorized to make grants to State and local air pollution control agencies to support the development and implementation of air toxics control and accident prevention and mitigation programs. In general, these grants will support activities described in the guidance and conducted in support of the Federal program. However, Federal funds may be used by the States to address air pollutants, emitted both routinely or through accidental events, not subject to control under the Federal programs established by sections 112 or 129.

States may develop comprehensive programs to participate as partners with EPA in the air toxics and accident prevention programs authorized by the Clean Air Act. The Administrator is to review and either approve or disapprove a State or local program within 180 days of a complete State submittal. During the 180-day review period, the Administrator is to provide notice that an approval determination is pending and is to seek public comment on the proposed State program. To the maximum extent practicable, the Administrator should, through guidance, encourage public participation in the development of State programs before submission. The legislation specifies a series of conditions that will warrant disapproval of any proposed State program: (1) the program does not assure compliance by all facilities in the State with standards and requirements issued under section 112 or 129; (2) adequate authority or resources do not exit to implement all elements of the program, including those specified in the Administrator's guidance; (3) the schedule for compliance by sources subject to standards and requirements is not sufficiently expeditious; or (4) the program is not in compliance with the guidance established by the Administrator or other objectives of section 112.

If the Administrator disapproves a State program, the Administrator is to notify the State of the modifications which would be necessary to secure approval. A State may then modify the program and resubmit it for consideration in the same manner as originally obtained.

If, subsequent to approval, the Administrator should determine that a State is not adequately implementing a program, the Administrator shall withdraw approval. Withdrawal may result when a State does not comply with guidance issued by the Administrator or when a State, subsequent to approval, fails one of the four criteria of section 112(1)(5) which would initially have led to disapproval. Withdrawal may ony be executed after the State has been notified of the deficiencies in writing and a public hearing on the State program has been held. A State has 90 days from the date of the notice of deficiencies to make corrective actions and avoid a withdrawal determination.

Section 112(1)(7) of this subsection maintains a provision of current law. No decision to approve a State program or delegate enforcement authorities would bar the Administrator from taking an enforcement action against a source violating an emission standard promulgated pursuant to section 112 or any other requirement established by section 112 or 129. It is also to be noted that the Environmental Protection Agency carries the full responsibility to enforce compliance with standards and requirements in those States without an approved program.

Technical Assistance for Small Sources.—Subsection (m) of the amended section 112 requires the Administrator and each State seeking approval of a program under section 112(l) to establish programs to assist the owners and operators of area sources in compliance with the requirements of this section.

This technical assistance effort would be best organized through a designated office in the pollution control or commerce department of each State. The office would provide information on measures, methods and technologies to control and monitor emissions of hazardous air pollutants. In addition, the office would assist the owners and operators of area sources which were required to obtain a permit under this section with the preparation of the permit application. The office could provide these services directly and charge a fee to support its work or it could serve as broker referring owners and operators to consulting engineers and others who could provide the services. The office could be structured so that information shared by the owner or operator would not be the basis for enforcement actions.

The Administrator is to assure that the clearinghouse established by section 112(l) is operated to support State-based technical assistance programs as described here.

Beyond technical assistance in compliance with standards imposed under this section, State programs of this type might achieve additional emissions reductions of hazardous air pollutants by encouraging voluntary reduction programs to be implemented by the owners and operators of area sources not otherwise subject to a standard. The emissions reductions to be achieved using feasible and available technology may be offered by the owner of the facility in exchange for a commitment that future regulation by the State will not force installation of more stringent controls until the current equipment or methods have been fully amortized. Programs of this kind should be encouraged by the Agency and supported with grant funds.

State Authority.—Subsection (n) of the amended section 112 explicitly preserves the authority of States and their political subdivisions to regulate the emissions of toxic air pollutants either by: 1) imposing more stringent requirements on pollutants or facilities controlled under the authority of section 112; or 2) establishing standards or requirements for pollutants or facilities not addressed by the Agency under the Federal program.

Section 112 as amended by this legislation is intended to create a comprehensive Federal scheme for the regulation of toxic air pollutants. This regulatory regime provides a significant role for State and local governments which choose to participate in the Federal program. On other occasions where similar schemes have been enacted, Federal courts have concluded that the Federal law is preemptive of some State or local authorities even when such preemption was not explicitly stated or intended. To assure that such preemption of State or local law, whether statutory or common, does not occur, environmental legislation enacted by the Congress has consistently evidenced great care to preserve State and local authority and the consequent remedies available to the citizens injured by the release of harmful substances to the environment.

Subsection (n) preserves the regulatory authority of States and their subdivisions in this field in the broadest way, noting several exceptions. First, States and their political subdivisions may not promulgate standards or requirements applicable to a pollutant or facility which are less stringent than the Federal standards or requirements established under this section which are applicable to the same source or pollutant.

Second, nothing in this section would allow a State or political subdivision to regulate emissions from mobile sources where that would otherwise be prohibited by the Clean Air Act.

Publicly Owned Treatment Works.—Wastewater treatment units processing domestic sewage may be major or area sources of hazardous air pollutants. The waters received by these POTWs may contain a large number of chemical solvents, industrial process wastes and discarded consumer products that are vented to the air when the water is treated at the POTW. For instance, effective treatment at many POTWs requires that the wastewater be thoroughly aerated, a process which volatilizes the solvents which may be dissolved in the sewage.

In addition, other treatment steps taken at a POTW may contribute to air pollution directly. The addition of chlorine to kill bacterial agents in the sewage may cause significant emissions of chlorine gas or chlorine treatment byproducts which are listed pursuant to section 112(b) as hazardous air pollutants.

A 1989 study released by EPA ("Cancer Risk from Outdoor Exposure to Air Toxics") indicates that the 1,621 POTWs which handle the largest portion of the industrial wastewaters indirectly discharged (97 percent) emit 4,840 metric tons of trichloroethylene, 3,230 metric tons of perchloroethylene, 2,130 tons of methylene chloride, 439 tons of chloroform, 182 tons of acrylonitrile, 102 metric tons of ethylene dichloride and 48 metric tons of carbon tetrachloride per year. Additive cancer risks to the most exposed individual from POTWs may be as high as 4.5×10–2 (4.5 additional cases of cancer for every 100 persons exposed to the most concentrated emissions at the fenceline of POTW over a period of 70 years). In terms of annual cancer incidence, indirect discharges from the organic chemical industry, equipment manufacturing and pharmaceutical manufacturing made the largest contribution to these increased risks.

Whether a specific POTW is a major or area source of hazardous air pollutants will depend on the size of the plant, the nature of the wastestreams it receives and the treatment processes which are employed at the facility.

Among the hazardous air pollutants emitted by POTWs are carbon tetrachloride, ethylene dichloride, perchloroethylene and trichloroethylene. Pursuant to section 112(e) emissions standards requiring the use of maximum achievable control technology are to be promulgated for major sources of these pollutants not later than

24 months after enactment of the legislation. However, and because the emissions and control technologies for POTWs are not well-characterized presently, paragraph (6) of section 112(e) delays the promulgation of any MACT emission standard applicable to POTWs to the date five years after enactment of the legislation. The Administrator has a non-discretionary duty to promulgate the emissions standards for POTWs which are covered by the definition of major source not later than five years after the date of enactment.

Subsection (p) of section 112, as amended, provides the Administrator with discretionary authority to enter into demonstration projects jointly with the owners and operators of POTWs to characterize emissions from such sources, to determine the industrial, commercial and residential sewage discharges which contribute to those emissions and to develop and demonstrate control technologies and methods which would achieve the maximum degree of emissions reduction as provided in section 112(d). To facilitate these demonstration projects and the collection of data on POTW emissions, the Administrator is to promulgate uniform methods for sampling, monitoring and assessing risks for POTW emissions of hazardous air pollutants.

Subsection (p) also requires the Administrator to consider pretreatment programs and product or process substitutions when establishing MACT standards which are to be applicable to POTWs.

Pretreatment rules are established under authority of title III of the Clean Water Act and apply to facilities grouped in various industrial categories. The categorical pretreatment standards generally require that wastewaters be treated before they are discharged to domestic sewage systems. However, discharges from many industrial facilities are not currently subject to categorical standards, the development and enforcement of such standards by some POTWs have been deficient and the standards which do exist have not been established with a view to preventing emissions of hazardous air pollutants. MACT emissions standards for POTWs under this section may be established in concert with new or more stringent categorical standards for various industries or more stringent general pretreatment requirements which apply to all direct dischargers.

Where the Administrator finds that emissions of hazardous air pollutants result from the use or disposal of a particular consumer product or wastes from commercial firms, the Administrator may impose requirements for product or process substitutions as part of the MACT standard. Section 112(d) generally gives preference to control strategies which prevent pollution rather than merely capturing, treating or containing it at the end of the process. This general preference does not, however, preclude the imposition of control technologies at POTWs which meet the criteria established for MACT standards established by section 112(d). The selection of emissions standards for major sources that "achieve the maximum degree of reductions in emissions" shall not be interpreted or applied to require the use of control technologies or methods at POTWs which would interfere with the treatment of wastewater having a detrimental impact on water quality greater than any benefit in the air quality improvements that would be achieved.

Hydrogen Sulfide.—Subsection (q) of the section 112, as amended, directs the Administrator to assess the public health and environmental hazards of hydrogen sulfide emissions associated with oil and gas extraction. The assessment is to include a review of existing State and industry control standards, techniques and enforcement.

Hydrogen sulfide is a colorless gas that is fatal to humans at concentration levels of 500 parts per million and above. Severe health effects are produced by hydrogen sulfide concentrations greater than 50 parts per million. While ambient levels of hydrogen sulfide are below those known to cause symptoms of injury to higher plants, higher peak exposures associated with accidental releases may have an effect on vegetation. Effects on wildlife have not been documented from ambient hydrogen sulfide levels, although high levels from accidental releases can be lethal.

Hydrogen sulfide occurs in widely varying concentrations as a natural constituent of oil and natural gas production and in some instances concentrations may be high enough to pose a threat to human health if a release to the ambient air occurs.

In testimony received by the Committee in 1987, a number of witnesses urged the listing of hydrogen sulfide as a toxic air pollutant under the provisions of section 112. The testimony documented episodes where releases of hydrogen sulfide from oil and gas facilities have caused human fatilities and injuries, numerous livestock kills and evacuation of the residents from affected areas. Hydrogen sulfide is included on the list of hazardous air pollutants established by section 112(b).

Many States have established and are enforcing comprehensive regulations for the control of hydrogen sulfide releases at oil and gas extraction facilities. Generally, these regulatory programs require that operators of facilities producing oil and natural gas with hydrogen sulfide concentrations must post warning signs, fence areas with the potential for public exposure, install safety and warning devices and establish contingency plans to alert and protect the public.

Although many State programs are implemented conscientiously, in some instances concerns have been raised that some oil- and gas-producing States may not be enforcing their regulatory programs sufficiently or may have deficient regulatory programs.

On the other hand, States with hydrogen sulfide emission programs that provide adequate health and environmental protection will probably not be required to alter those programs, as the result of listing hydrogen sulfide as a hazardous air pollutant under section 112(b). The purpose of this subsection is to assess the effectiveness and the level of enforcement of various hydrogen sulfide control programs. In the development of MACT standards applicable to sources of hydrogen sulfide, the Administrator should take into account the measures already in place under those programs aggressively administered in some States. The assessment should assure more uniform application of control technology, standards and enforcement. The Administrator should examine in particular means of preventing accidental releases of hydrogen sulfide at remote facilities.

Savings Clause.—Subsection (r) of section 112 provides that emissions standards for source categories of hazardous air pollutants which have been promulgated before enactment of this legislation shall not be affected by the amendments to the other subsections of section 112 which are made by the bill. Rather the existing national emissions standards for hazardous air pollutants (NESHAPs) are to continue in effect until such time as they require revision (as the result of changed circumstances or new information).

The bill includes this "savings clause" to further the goal of regulatory stability and to assure that limited regulatory resources are employed to control sources of hazardous air pollutants yet unaddressed. NESHAPs have been promulgated for various (but not all) source categories of seven pollutants: inorganic arsenic; asbestos; beryllium; benzene; vinyl chloride; radionuclides; and mercury. One other substance, coke oven emissions, has been listed, but it is not likely that a NESHAP for coke ovens will be promulgated before enactment of this legislation.

Standards which have been promulgated may in the future be amended (either on the initiative of the Agency or by court order) and any such amendment will be in accordance with the provisions of section 112 as amended by this legislation, except for source categories of radionuclides for which standards were proposed in the *Federal Register* on March 7, 1989 (54 *Federal Register* 9612). In the case of radionuclide emissions from these source categories the Administrator is to promulgate any revised standard under the authorities of section 112 as in place before the enactment of this legislation.

Because each of the seven pollutants previously regulated is listed pursuant to the amended section 112(b) (the seven are among the 191 initially listed), a standard nullified or in need of revision would be replaced, in the first instance, with a MACT standard under section 112(d) (and again with the exception of some sources of radionuclides). If necessary, standards to reduce residual risks may also be promulgated for source categories of these already regulated seven pollutants.

With respect to radionuclides, in the event that the standards that have been promulgated for sources of radionuclides referenced above are invalidated by a court, this subsection requires the Administrator to proceed under the existing authority of section 112 to revise the standard. The 12 source categories for which standards were proposed in March 1989 include: Department of Energy facilities; NRC and non-DOE Federal facilities; nuclear power reactors and their support facilities; elemental phosphorous plants; coal-fired boilers; high-level nuclear waste facilities; DOE radon sources; phosphogypsum piles; underground uranium mines; surface uranium mines; operations of uranium mill tailings piles; and disposal of uranium mill tailings piles.

Standards for sources of the any of the seven pollutants in categories or subcategories for which standards have not been promulgated (including categories and subcategories of radionuclide emissions except for those regulated by the Nuclear Regulatory Commission and for the subcategory of grate calcination phosphorous plants) shall be promulgated according to the amended provisions of section 112 as amended by the Clean Air Act Amendments of

1989 and on the schedules established pursuant to section 112(e). Amendments made by section 305 of the bill exclude radionuclides emitted by sources licensed by the NRC from regulation under the Clean Air Act. Section 112(r) directs the Administrator to established emissions standards for grate calcination phosphorous plants as a separate subcategory under the authorities of section 112 as in effect prior to enactment of this legislation.

To the extent that any of the sources subject to the savings clause (including sources of radionuclides) emit other hazardous air pollutants for which a standard may be set under the amended section 112, nothing in this subsection shall be interpreted or applied to defer, delay or exempt such sources from standards for such other pollutants.

The "savings clause" was included in this legislation before the most recent standards for sources of radionuclides were published and thus cannot be read to imply Congressional assent to any promulgated NESHAP under the provisions of section 112 as in place before these amendments were enacted. The "savings clause" was adopted to prevent application of new authorities; not as an endangerment of any standard established under existing law.

Annual Report.—Subsection (t) of section 112, as added by the bill requires the Administrator of the Environmental Protection Agency to submit an annual report no later than January 15 of each year describing the activities of EPA and the States in carrying out the air toxics program authorized by section 112 and the accident prevention program established by the new section 129.

To assist in the preparation and assure the thoroughness of this report, the Administrator is to maintain a database on the sources and pollutants covered by regulations under section 112. This database shall be compiled from permits and emissions reports submitted by the owners and operators of each source subject to an emissions standard under this section. It should also include an inventory describing emissions of hazardous air pollutants from area and mobile resources. The Administrator may use the authorities of section 114 including reporting and registration requirements imposed on the owners or operators of area sources to assure that information on emissions from area sources is valid and reliable.

Material from the data base included in the annual report shall include national emissions of hazardous air pollutants speciated by pollutant, arrayed by geographic region or State, and reported for industrial or area source categories.

Five specific items are to be included in the report. The Administrator is to provide an update on the standard-setting process for subsections (d), (f) and (g) of section 112 listing each source category and the expected date for completing the technology-based standards, residual risk reviews and the health-based standards which may be indicated. To the extent that standards for a source category have not been completed according to the statutory schedule, the Administrator is to explain the reasons for delay and indicate the corrective actions which are being taken to achieve expedited promulgation.

Second, the report is to contain information on compliance rates and enforcement actions which have been taken. Under the existing air toxics program (and several other programs administered by the Agency), compliance data is kept at the regional level and is not aggregated to determine progress at meeting the environmental goals established by law. Stringent standards included in regulations and permit limits do not achieve their purpose, if they are frequently violated and no enforcement action is taken. The permit provisions of this section require the owners and operators of facilities violating standards to "self-monitor" and provide notice of such violations. The annual report is to include a careful accounting of these reported violations and other information which can be reasonably collected by the Administrator and which is indicative of the level of compliance with the requirements imposed here.

Information in the report on compliance shall also include specific costs to regulated entities as the result of standards issued under section 112 or section 129. These costs should be reported by industrial category and should include projections of compliance costs for each industry expected in future years to the extent possible. The cost estimate may also report the benefits associated with control requirements including the reduction in cancer incidence, reductions in risk for maximally exposed individuals, environmental and welfare impacts and benefits associated with other aspects of the air pollution control program including reductions in emissions of ozone and particulate matter precursors attributable to the standards established here.

Third, the report is to include an update on the development of the national urban air toxics program established by subsection (k).

The report is to include a listing of the recommendations made by the Chemical Safety Board established under section 129 and the actions which the Administrator has taken in response to any such recommendations. The report may also include recommendations of the Administrator with respect to changes in law which would further the purposes of section 112 or section 129.

The report may also include an estimate of the expenditures made by EPA and State and local air pollution control agencies to implement the requirements of this sections 112 and 129.

Authorization.—Subsection (u) of section 112, as added by the bill, authorizes the appropriation of such sums as are necessary to carry out each of the provisions described above. The authorization is without fiscal year limitation.

MARINE MANUFACTURING (SECTION 302)

SUMMARY

Section 302 is a free-standing provision (not an amendment to the Clean Air Act) which requires the Administrator to list boat manufacturing as a separate subcategory of sources when establishing emissions standards under section 112 for styrene, unless the Administrator finds that such listing is inconsistent with requirements of the Act.

DISCUSSION

This provision is designed to recognize that there are differences relevant to standard-setting between the manufacturing process for recreational boat building and for other industries that use styrene. Emissions from the recreational boat building industry are far greater in air volume and lower in styrene content than similar emissions from other segments of the reinforced plastics industry which use different manufacturing processes. Citing this difference is not to suggest any conclusion in terms of risk to public health from styrene any conclusion in terms of risk to public health from styrene emissions of any industry; but rather is only to indicate that requiring the same technology-based emissions standards for boat manufacturing as are mandated for other segments of the reinforced plastics industry may impose disproportionate costs on boat builders. Therefore, the provisions establishes a separate subcategory for recreational boat manufacturing.

If the Administrator demonstrates that the costs of achieving compliance and any non-air quality health and environmental impacts or energy requirements will not be borne disproportionately by the recreational boat building industry, then the Administrator may find that a separate listing for recreational boat builders would be inconsistent with the goals and requirements of the Clean Air Act and would not be required to establish such a subcategory when regulating styrene emissions.

DUAL REGULATION OF RADIONUCLIDES (SECTION 303)

SUMMARY

This section of the bill amends Section 302(g) of the Clean Air Act to exclude radioactive materials regulated by the Nuclear Regulatory Commission (NRC) or an Agreement State under the Atomic Energy Act from the definition of "air pollutant." Thus, in the future, such materials will be regulated solely under the Atomic Energy Act.

DISCUSSION

Under existing law, emissions of radionuclides from facilities licensed by the NRC are regulated under both the Atomic Energy Act and the Clean Air Act. The Atomic Energy Act of 1954, as amended, and the Reorganization Plan No. 3 of 1970 provide EPA with the authority to establish generally applicable environmental standards for the release of radioactive materials regulated under the Atomic Energy Act. The standards established by EPA under this authority must be adequate to protect the public health and safety and are not to consider cost.

Using this authority, EPA has promulgated environmental standards for the operation of uranium fuel cycle activities which include nuclear power plants, uranium mills, and nuclear fuel fabrication facilities. EPA also has established generally applicable environmental standards for high-level and transuranic waste storage and disposal facilities.

NRC enforces these standards at NRC-licensed facilities by promulgating regulations governing the operation of those facilities. Additionally, NRC requires that radionuclide emissions from facilities under their jurisdiction be "as low as reasonably achievable."

At present, these same radionuclide emissions also are regulated under the Clean Air Act. In 1979, EPA listed radionuclides as a "hazardous air pollutant" under Section 112 of the Clean Air Act. After considerable litigation over several years concerning the scope of the EPA's resulting obligation under the Clean Air Act to issue National Emission Standards for Hazardous Air Pollutants (NESHAP) for radionuclides, the EPA issued, on November 1, 1989, final emission standards for radionuclides. In promulgating the rule, EPA stated that the decisions in *Natural Resources Defense Council* v. *EPA,* 824 F. 2d at 1146 (D.C. Cir. 1987) (the *Vinyl Chloride* case), and *Sierra Club* v. *Ruckelshaus,* 602 F. Supp. 892 (N.D.Cal. 1984), compelled EPA to issue a NESHAP for radionuclides.

The section 112 standards cover various sources of radionuclides, including all NRC licensees. In addition to establishing numerical standards for air emissions of radionuclides at these facilities, EPA has imposed various recordkeeping, monitoring, and reporting requirements for the sources covered.

During the legal controversy over the EPA's obligation to issue a NESHAP for radionuclides, EPA stated on several occasions that the regulation of radionuclide emissions from sources regulated by NRC under the Atomic Energy Act already provided adequate protection to the public health and safety. For example, in 1984, EPA stated that to issue an emission standard for uranium fuel cycle facilities in addition to the Atomic Energy Act standard "would be duplicative and . . . would not offer any additional public health protection." 50 Fed. Reg. at 5191.

Similarly, with respect to other NRC licensees, EPA stated that:

> EPA continues to believe existing emissions from these sources are already so low that the public health is already protected with an ample margin of safety, even without regulations. . . . Since the beginning of regulation under section 112, EPA has interpreted this section as not requiring regulation in cases where the risks from a category of sources do not exceed a certain minimum threshold. Indeed, contrary interpretations lead to results that are hard to defend from any logical or policy perspective. *Id.*

Despite its objections, EPA nonetheless proceeded to issue a radionuclide NESHAP for these licensees as required under the Clean Air Act pursuant to the order of the U.S. District Court in *Sierra Club* v. *Ruckelshaus, supra.* The radionuclide NESHAP issued by the EPA for these licensees under the Clean Air Act was approximately equivalent to the environmental standard for uranium fuel cycle facilities issued by EPA under the Atomic Energy Act, and reflected existing control technologies, operating practices, and emission levels of the non-fuel cycle licensees.

NRC objected to the inclusion of NRC licensees in the EPA radionuclide NESHAP issued on November 1, 1989. During the EPA rulemaking, NRC commented that "the proposed rule is not necessary as a matter of health risk, regulatory policy, or law." NRC stated that the existing regulatory structure already "provide[s] a very high degree of protection of public health and safety."

Although both EPA and NRC have stated that regulation of radionuclides under the Clean Air Act will not provide significant public health benefits, such regulation will entail additional and significant costs. Methods for demonstrating compliance with the Atomic Energy Act differ from the methods for demonstrating compliance with the Clean Air Act standards. The compliance criteria also are different. Monitoring, recordkeeping, and reporting requirements impose significant costs upon the regulated entity under both statutes. These costs are not justified in the absence of a significant public health benefit.

Dual regulation is expensive not only for the regulated entity but also for the regulating agencies. If regulation were to continue under two separate statutes, both EPA and NRC would need to devote substantial resources to enforcing duplicative regulations. Considering the shortage of funds available for the enforcement of environmental laws, it is important to make scarce resources available for non-duplicative activities.

Both EPA and NRC support an amendment to the Clean Air Act to eliminate dual regulation of NRC licensees under both the Atomic Energy Act and the Clean Air Act.

Accordingly, section 303 eliminates regulation under the Clean Air Act of radionuclides already regulated by NRC under the Atomic Energy Act. Section 303 deletes from the definition of "air pollutant" in section 302 of the Clean Air Act radionuclides which are emitted from a facility licensed by NRC or by a State which has an agreement with the Commission pursuant to section 274 of the Atomic Energy Act (i.e., an "Agreement State"). Other conforming amendments to section 122 are made as well.

In addition, the savings clause (section 112(r), as amended by the Clean Air Act Amendments of 1989) excludes sources subject to licensing by NRC from the radionuclide emission standard preserved by that provision. Thus, the radionuclide emission standards issued by EPA on November 1, 1989, for facilities licensed by the NRC or Agreement States are nullified.

Because DOE facilities are not licensed by NRC, radionuclide emissions from those facilities would continue to be regulated by EPA under the Clean Air Act. Radionuclide emissions from other non-NRC sources also are not affected by this section, and would continue to be regulated by EPA under the Clean Air Act. In addition, EPA's regulatory authority to set generally applicable environmental standards for radionuclides under the Atomic Energy Act is not affected by this section.

PREVENTION OF SUDDEN, ACCIDENTAL RELEASES (SECTION 304)

SUMMARY

Section 304 of the bill adds a new section 129 to the Clean Air Act to establish programs and requirements to prevent catastrophic chemical accidents and to mitigate the consequences of such accidents when they do occur. These authorities are to be coordinated with other accident prevention and response authorities assigned to the Environmental Protection Agency including the programs established by the Emergency Planning and Community Right-to-Know Act of 1986.

The new section 129 addresses substances which, when released into the air in significant quantities, may, even in periods of limited exposure, cause death or illness. The objective of the programs established under this section is to prevent the release of such extremely hazardous substances and to assure that mitigation and response measures are in place should an accidental release occur.

The responsibility to prevent releases of these extremely hazardous substances is the general duty of the owners and operators of facilities producing, processing, handling or storing such substances, whether or not explicit requirements have been imposed under this section or other authorities.

Some of the requirements imposed by the section are only applicable to those facilities handling a substance or substances specifically listed by the Administrator pursuant to subsection (c) of the new section 129. Subsection (c) requires the Administrator to publish an initial list of at least 50 substances including 25 identified by name in the statutory provisions. The Administrator is to add substances to this list as necessary to carry out the goals and objectives of this section and the Act. A threshold quantity is to be established for each substance at the time of listing.

The owner or operator of each facility at which any one of the extremely hazardous substances listed pursuant to subsection (c) is present in more than threshold quantities is required to conduct a hazard assessment to determine the effects of an accidental release of the substance from the facility. A hazard assessment is an engineering analysis of a facility or process in which an extremely hazardous substance is used to determine the potential for any accidental release and the consequences (death, injury or property damage) which would likely occur in the event of an accidental release. Information developed through the hazard assessment may be used by the owner to prevent accidents, by the surrounding community to prepare response plans and by the State and Federal Government in the development of accident prevention programs and requirements. The Administrator is to publish guidance to be used by facility owners and operators in preparing hazard assessments.

The bill establishes a new entity, the Chemical Safety and Hazard Investigation Board, to investigate and report on accidents involving death, serious injury or substantial property damage which are associated with chemical production, processing, handling or storage. The Board is modeled on the authorities of the National Transportation Safety Board which investigates fatal accidents in the transportation sector (airline, railroad, pipeline, highway and marine accidents).

The Chemical Safety and Hazard Investigation Board is to be an independent agency with three members, its own staff of investigators and an annual budget of $12 million. The Board has the power to compel testimony and inspect facilities in the conduct of its accident investigations. The Board may conduct investigations of other chemical hazards or potential hazards whether or not an accident has occurred. The Board may establish regulations for reporting releases of extremely hazardous substances. Information collected by the Board in the conduct of its studies and investigations may be protected from disclosure to the public, if trade secrets would be divulged.

The Board may make recommendations to the Administrator of the Environmental Protection Agency for action to prevent or mitigate chemical hazards, either through regulation or by the issuance of administrative orders. The Board may also recommend listing particular substances as extremely hazardous under the authorities of subsection (c). If the Board makes recommendations, the Administrator is to respond by issuing the proposed regulation or order or stating why implementation of the recommendation would not be appropriate.

The bill provides the Administrator of the Environmental Protection Agency with authority to promulgate accident prevention regulations applicable to facilities which handle any extremely hazardous substance. These regulations shall assure release prevention and mitgation by imposing design or operational standards, vapor recovery or secondary containment requirements, training, reporting and monitoring requirements, and release detection and correction requirements. The Administrator may also require by regulation that the owner or operator of any facility prepare and submit a risk reduction plan.

The bill provides the Administrator with authority to seek injunctive relief in a district court or to issue an administrative order to abate any release or threat of a release of an extremely hazardous substance where such release endangers public health or the environment.

The President is required to conduct a review of the accident prevention and investigation authorities of various Federal agencies and report to Congress with respect to any modifications of legislative authority which may be appropriate.

The authority of State and local governments to establish accident prevention or mitigation requirements more stringent than those established pursuant to the new section 129 is explicitly preserved.

DISCUSSION

Section 304 of S. 1630 as reported adds a new section 129 to the end of Title I of the Clean Air Act.

The objective of the new section 129 is to establish programs and requirements: (1) that will prevent the accidental release of substances that may cause death, injury or property damage as the result of even short-term exposures; and (2) that will minimize the consequences of such accidential releases when they do occur.

There are four major elements in this proposed program. Perhaps most important is the creation of a new Chemical Safety and Hazard Investigation Board which will investigate chemical accidents which cause death, serious injury or substantial property damage. The Board is not a regulatory agency, but is to function as a source of expertise at the center of the chemical accident prevention and response programs of the Federal Government. It will investigate serious accidents and other health and safety issues related to the production and handling of extremely hazardous substances and will make recommendations with respect to accident prevention measures which may be promulgated by the agencies with regulatory authority. The Board may also serve as a point of communication among the various Federal agencies to improve the effectiveness of accident prevention programs and reduce the burden of duplicative requirements on regulated entities.

A second element of the program authorizes the Administrator of the Environmental Protection Agency to establish accident prevention requirements applicable to facilities handling extremely hazardous substances. The requirements may cover operating procedures, training, release prevention systems, detection and monitoring, preventive maintenance, emergency planning and similar functions at a facility. These are regulatory requirements, but the authority to impose them is discretionary with the Administrator. Generally, the requirements promulgated bythe Administrator will be in response to recommendations made by the Board. The Board, through its investigations and reports, is to drive the regulatory agenda in this field.

A third element of the program is mandatory. The owner or operator of every facility handling any one of a specific list of extremely hazardous substances must conduct a hazard assessment to determine what kind of accidental releases might occur at the facility and what the effects would be, if a release did occur. The Administrator is to trigger this requirement by listing not fewer than 50 substances, 25 of which are named in the statutory language. Information in the hazard assessment is to be used by the facility operator to reduce the risk of accidential releases which may have catastrophic consequences.

A fourth element of the program is a general duty imposed on each facility owner or operator to operate a safe facility free of accidental releases that threaten life of property. The facility owner or operator is obligated to take all feasible actions that are available to reduce hazards which are known to exist at that particular facility or which have been identified for similar facilities in the same industrial group. The Administrator is authorized to seek injunctive relief or issue administrative orders to assure that no facility presents an imminent and substantial endangerment to public health, welfare or the environment.

Although the programs established here are focused on releases to the air, it is not intended that these prevention and mitigation efforts should not be segregated from other hazardous release prevention programs conducted with respect to other media (for instance, the spill prevention, control and countermeasures (SPCC) program developed under the Clean Water Act, the reporting requirements and removal program authorized by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and the Emergency Planning and Community Right-to-Know program established by the Superfund Amendments and Reauthorization Act (SARA)). To the extent practicable, the new authorities established by section 129 should be implemented in conjunction with other accidential release prevention, mitigation and response efforts.

Purpose and General Duty.—The objectives of the proposed section 129 include both the prevention of accidential releases and the minimization of the consequences which may result. Systems and measures which are effective in preventing accidents are preferable to those which are intended to minimize the consequences of a release. Measures which entirely eliminate the presence of potential hazards (through substitution of less harmful substances or by minimizing the quantity of an extremely hazardous substance present at any one time), as opposed to those which merely provide additional containment, are the most preferred.

Subsection (a) of the new section 129 of the Act includes a "general duty clause" placing the responsibility to design and maintain a safe facility (one free of accidents, but equipped for release mitigation and community protection should a release occur) on the owner or operator of the facility.

The Occupational Safety and Health Act includes a similar general duty clause which provides that:

> Each employer . . . shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees . . .

The Occupational Safety and Health Administration cites this clause for enforcement purposes when a hazard is found in the workplace for which there is no specific OSHA regulation or standard, and when the employer is aware that the hazard exists.

The standard for applying the general duty clause has been described (for the OSHA statute) in the case *Secretary of Labor* v. *Duriron Company, Inc.,* 11 OSHC 1405 upheld by the courts on appeal. This decision is cited to indicate that a similar standard is an appropriate application of the general duty to operate a facility free from accidents established by the proposed section 129(a).

> In order to establish a . . . violation, the Secretary must prove: (1) the employer failed to render its workplace free of a hazard, (2) the hazard was recognized either by the cited employer or generally within the employer's industry, (3) the hazard was causing or was likely to cause death or serious harm, and (4) there was a feasible means by which the employer could have eliminated or materially reduced the hazard. *Secretary of Labor* v. *Duriron Company, Inc.,* 11 OSHC at 1407.

The employer's awareness of the hazard may be documented by the existence of an industry code or consensus standard (such as the "Boiler and Pressure Vessel Code" or the "Compressed Gas Standard") which is used by others operating similar facilities within the industry.

Feasible means of preventing death, serious injury or substantial property damage outside of the boundary of the facility would include not only the prevention and mitigation measures employed to reduce the likelihood or extent of a hazard moving across the boundary, but also public warning (alert) and emergency response systems which may reduce exposure to the hazard if it reaches the community. Facility owners and operators would need to implement all feasible means to reduce the threat of death, serious injury or substantial property damage to satisfy the requirements of the general duty clause.

During its recent Chemical Special Emphasis Program (ChemSEP), OSHA frequently found that its health and safety regulations (which are designed to protect against continuous exposure to routine releases) were not well-suited to prevent or mitigate sudden, accidental releases and used the general duty clause frequently to justify citations for unsafe conditions requiring corrective action which were identified by the ChemSEP audits. The general duty clause established by subsection (a) of the new section 129 may be used by EPA in similar ways and for similar purposes.

The general duty clause has been included, in part, as a response to concerns expressed by the Environmental Protection Agency. Subsection (d) requires the owner or operator of each facility producing, processing, handling or storing an extremely hazardous substance to prepare a formal hazad assessment, identifying the potential for an accidental release of these substances as the result of operations at the facility. The hazard assessment is to be made available to the Administrator. The Agency has expressed concern that the availability of such a document might in some way shift liability for any injury and damage caused by an accident (identified as a potential event in the assessment) to the Government absent some action by the Agency in response to the assessment (e.g. requiring that the hazard be reduced or removed). In the alternative, the owner or operator might use the failure of an Agency response to an identified hazard (realized in an accidental release) as a defense against liability for injury or damages caused to another party.

The general duty clause included in subsection (a) is intended to prevent either result. The liability of an owner or operator of a facility subject to the requirements of this section for the injury or damage caused by a sudden, accidental release of an extremely hazardous substance will in no way be affected by compliance with such requirements.

Definitions.—Subsection (b) of the new section 129 defines two terms used throughout the section, "accidental release" and "facility".

An accidental release is any event which introduces an extremely hazardous substance into the air whether directly or indirectly. Releases which are authorized by a permit or are subject to an emission limitation or standard under the Clean Air Act or other Federal law would not be considered accidental releases for the purposes of this section.

Accidental releases would not include release from vents and releases resulting from process upsets which are planned and are designed to prevent catastrophic events. Many industrial facilities have safety designs which require infrequent not regular) releases through the use of "relief valves" for the purpose of preventing system overloads that would otherwise lead to explosions or other significant accidents. These "safety" releases, while not routine, may be authorized and necessary and would not cause death, injury or property damage. Releases of this type are appropriately subject to regulation under section 112 of the Clean Air Act rather than the new section 129 established here.

An accidental release is one which causes or may cause immediate (or near-term) death, serious injury or substantial property damage as the result of exposure to an extremely hazardous substance over limited periods of time. It does not include releases, even when accidental (for instance, as the result of process upsets), where the potential impact on public health is a measurable increase in the probability of death, illness or adverse effect which is normally associated with "chronic" exposures over a long period. Episodic releases of the latter kind are to be addressed by requirements under section 112. However, when considering the seriousness of the risk posed by toxicants which can cause acute effects, the Administrator may also take into account any "chronic" health effects which may be associated with these toxicants to determine whether further regulation is justified.

A facility is defined in the broadest sense to include any structure or activity or point or nonpoint source of a relase, except that the term does not include the right-of-way of any railroad outside a railroad yard.

The term "extremely hazardous substance" is not defined in the legislation although it is used throughout the new section 129. Extremely hazardous substances would include, but are not limited to, those substances which are specifically listed by the Administrator under subsection (c). They would also include substances which have been listed under section 302 of the Emergency Planning and Community Right-to-Know Act of 1986. There are approximately 360 substances on that list.

Extremely hazardous substances would also include other agents which may or may not be listed or otherwise identified by any Government agency currently which may as the result short-term exposures associated with releases to the air cause death, injury or property damage due to their toxicity, reactivity, flammability, volatility or corrosivity. The release of any substance which causes death or serious injury because of its acute toxic effect or as the result of explosion or fire or which causes substantial property damage by blast, fire, corrosion or other reaction would create a presumption that such substance is extremely hazardous.

Throughout this subsection the phrases "production, processing, handling or storage" or "produce, process, store or handle" or "manufactures, stores, and processes" are used to describe activities which may give rise to a sudden, accidental release of hazardous substances. These phrases should be interpreted to include the broadest set of activities associated with the manufacture and use of chemical substances including, but not limited to, transportation and the use of the chemical in commercial, agriculture, mining and industrial activities.

List of Substances.—Subsection (c) of the new section 129 of the Act directs the Administrator to prepare a list of extremely hazardous substances. At the time of listing any substance, the Administrator shall also establish a threshold quantity for such substance. Facilities handling the listed substances in more than threshold amounts will be required to register with the appropriate State agency pursuant to section 112(l)(2) and prepare hazard assessments as required by subsection (d) of this section. In addition, the Administrator will require facilities handling listed substances in more than threshold amounts to install release detection systems for such substances pursuant to subsection (g).

The list of substances established under this subsection is only one aspect of the overall program, and should not be read to encompass all extremely hazardous substances (as the term is used more broadly here) or all requirements which may be imposed. Listing will trigger some regulatory requirements (such as reporting, hazard assessments, and leak detection) for the owners and operators of some facilities. But the Administrator's authority to promulgate accident prevention regulations under subsection (f), the Administrator's authority to issue orders or seek injunctive relief under subsection (h), the power of the Board to investigative accidents under subsection (e), and other authorities established by this section are not limited only to facilities handling the substances which have been listed.

The initial version of the list required by subsecton (c) is to be proposed not later than one year after the date of enactment of this legislation. It is to be promulgated within two years and may reflect recommendations of the Chemical Safety Board which is established by subsection (e). In its first few months, the Board is to review the techniques which have been developed in the field of hazard evaluation and is to consider the facilities and substances for which formal hazard assessments would be most useful making a report of its findings eighteen months after enactment (and six months before the initial list is to be promulgated by the Administrator).

The substances on the list may be drawn from the list of approximately 360 substances which have been included on the list required by section 302 of the Emergency Planning and Community Right-to-Know Act of 1986 (title III of the Superfund Amendments and Reauthorization Act of 1986 or SARA) or may include other substances which present comparable hazards or potential hazards. Substances included on the list are to be those which present the greatest threat of death, serious injury, evacuations or substantial property damage as the result of accidental releases.

The list is to be formally reviewed and revised (if necessary) at least every five years. However, it is expected that the Administrator will revise the list by adding substances on an irregular, but more frequent basis, reflecting recommendations made by the Chemical Safety Board in its written reports following the investigation of specific accidental releases.

TABLE III-8.—EXTREMELY HAZARDOUS SUBSTANCES

Sulfuric acid
Chlorine
Anhydrous ammonia
Hydrochloric acid
Methyl chloride
Ethylene oxide
Toluene
Vinyl Chloride
Methyl alcohol
Nitric acid (94 per centum by weight or more HNO3)
Styrene
Tetrachloroethylene
Ammonia
Hydrogen sulfide
Acetone
Methylene chloride
Benzene
Methyl ethyl ketone

Toluene diisocyanate
Phosgene
Sulfur dioxide (10 per centum or more by volume)
Formaldehyde (gas)
Butadiene
Hydrofluoric acid
Acrylonitrile

The legislation requires that the initial list include at least 50 substances. The statutory language identifies 25 substances (as indicated in Figure III-8) which are to be included on the list and may not be removed by subsequent revisions. These 25 substances were drawn from the Acute Hazardous Events Date Base (AHE/DB) which has been compiled by EPA and which is described above. The named substances are those which are associated with the largest number of accidental: (1) events; (2) deaths; (3) injuries; and (4) evacuations as indicated in Figures III-9 through III-11.

Figure III-9

SUBSTANCES MOST FREQUENTLY REPORTED IN ALL EVENTS *

RANK	SUBSTANCE NAME **	WEIGHTED TOTAL +	MAIN	SAMPLE	# OF DEATH EVENTS	# OF DEATHS	# OF INJURY EVENTS	# OF INJURIES	# OF EVAC EVENTS	# OF EVACUEES	TOTAL QUANTITY RELEASED (Lbs.)	AVERAGE QUANTITY RELEASED (Lbs.) ++	LARGEST QUANTITY RELEASED (lbs.)
1	SULFURIC ACID	1,058	208	85	4	5	62	380	31	15,055	70,000,000	86,000	1,500,000
2	CHLORINE	765	705	6	4	5	125	1,086	93	38,237	190,000	300	20,000
3	AMMONIA (ANHYDROUS)	644	534	11	1	1	66	250	68	12,201	3,600,000	8,100	1,575,000
4	HYDROCHLORIC ACID	536	256	28	1	1	68	968	79	49,693	5,400,000	15,000	1,125,000
5	SODIUM HYDROXIDE	499	89	41	1	1	27	40	12	5,070	31,000,000	81,000	1,125,000
6	METHYL CHLORIDE	341	291	5	0	0	2	31	5	4,600	190,000	700	37,500
7	PHOSPHORIC ACID	254	44	21	0	0	12	369	10	18,760	2,800,000	22,000	300,000
8	ETHYLENE OXIDE	225	225	0	0	0	4	108	11	9,725	2,800,000	15,000	2,400,000
9	TOLUENE	216	76	14	7	13	16	71	10	2,450	2,100,000	19,000	172,500
10	VINYL CHLORIDE	202	172	3	2	6	7	66	14	17,686	250,000	1,600	150,000
11	METHYL ALCOHOL	188	48	14	2	3	7	22	8	3,278	7,300,000	100,000	1,875,000
12	NITRIC ACID	186	76	11	4	21	18	361	21	17,142	4,100,000	32,000	150,000
13	STYRENE	144	54	9	1	0	13	32	12	17,250	520,000	6,000	82,500
14	TETRACHLOROETHYLENE	143	33	11	0	0	2	10	1	0	830,000	6,000	33,750
15	AMMONIA	132	112	2	2	6	26	308	21	5,158	2,000,000	31,000	1,500,000
16	HYDROGEN SULFIDE	125	115	1	2	3	9	157	12	3,022	1,200,000	14,000	1,000,000
17	ACETONE	118	28	9	1	3	5	9	3	451	1,100,000	1,500	60,000
18	METHYLENE CHLORIDE	114	44	7	1	2	8	481	6	3,750	140,000	1,800	7,500
19	BENZENE	99	49	5	2	16	11	436	9	4,800	1,800,000	23,000	400,000
20	METHYL ETHYL KETONE	89	36	5	4	6	9	231	6	574	330,000	4,800	2,888

* Includes all events in which the substance appears as the primary, secondary, or tertiary substance.

** All chemicals are commodity chemicals.

+ The weighted total equals MAIN plus ten times SAMPLE.

++ Average quantities are computed using only those events that reported quantities.

Figure III-10

SUBSTANCES MOST FREQUENTLY REPORTED IN DEATH/INJURY EVENTS *

RANK	SUBSTANCE NAME **	# OF EVENTS	# OF DEATH EVENTS	# OF DEATHS	# OF INJURY EVENTS	# OF INJ	TOTAL QUANTITY RELEASED (Lbs.)	AVERAGE QUANTITY RELEASED (Lbs.) ***	LARGEST QUANTITY RELEASED (Lbs.)
1	CHLORINE	125	4	5	125	1,086	49,000	660	10,000
2	HYDROCHLORIC ACID	68	1	1	67	968	300,000	11,000	45,325
3	AMMONIA (ANHYDROUS)	67	1	1	66	250	440,000	10,000	160,000
4	SULFURIC ACID	63	4	5	62	380	1,700,000	51,000	1,500,000
5	SODIUM HYDROXIDE	27	1	1	27	40	160,000	11,000	12,000
6	AMMONIA	26	2	6	26	308	58,000	5,800	48,750
7	NITRIC ACID	20	4	21	18	361	430,000	17,000	150,000
8	TOLUENE	17	7	13	16	71	28,000	9,200	22,500
9	STYRENE	14	1	0	13	32	53,000	8,800	45,000
10	TOLUENE DIISOCYANATE	12	2	3	11	112	19,000	290	938
11	PHOSPHORIC ACID	12	0	0	12	369	2,200	360	1,875
12	BENZENE	11	2	16	11	436	7,800	3,900	7,500
13	PHOSGENE	11	2	2	11	383	6,800	3,400	5,000
14	SULFUR DIOXIDE	11	0	0	11	61	1,300	430	1,125
15	HYDROFLUORIC ACID	10	2	3	8	664	270,000	90,000	270,000
16	METHYL ETHYL KETONE	10	4	6	9	231	90	90	90
17	ACRYLONITRILE	9	1	1	9	146	900,000	225,000	400,000
18	METHYLENE CHLORIDE	9	1	2	8	481	4,100	1,400	2,053
19	HYDROGEN SULFIDE	9	2	3	9	157	38	38	38

* Includes all events in which the substance appears as the primary, secondary, or tertiary substance.

** All substances are commodity chemicals.

*** Average quantities are computed using only those events that reported quantities.

Figure III-11

SUBSTANCES MOST FREQUENTLY REPORTED IN EVACUATION EVENTS

RANK	SUBSTANCE NAME *	# OF EVENTS **	# EVAC ALL SUBS	TOTAL QUANTITY RELEASED (Lbs.)	AVERAGE QUANTITY RELEASED (Lbs.) ***	LARGEST QUANTITY RELEASED (Lbs.)
1	CHLORINE	93	38,126	53,000	1,200	20,000
2	HYDROCHLORIC ACID	79	49,693	1,500,000	52,000	1,125,000
3	AMMONIA (ANHYDROUS)	68	12,201	450,000	12,000	160,000
4	SULFURIC ACID	31	15,055	1,600,000	130,000	1,500,000
5	NITRIC ACID	21	17,142	150,000	17,000	135,000
6	AMMONIA	21	5,158	180,000	20,000	112,500
7	VINYL CHLORIDE	14	17,686	150,000	38,000	150,000
8	HYDROGEN SULFIDE	12	3,022	1,700	330	1,000
9	SODIUM HYDROXIDE	12	5,070	41,000	3,100	30,000
10	STYRENE	12	17,250	160,000	26,000	82,500
11	TOLUENE DIISOCYANATE	11	4,959	16,000	5,400	15,000
12	ETHYLENE OXIDE	11	9,725	350,000	88,000	202,500
13	PHOSGENE	10	1,159	100	50	90
14	TOLUENE	10	2,450	47,000	16,000	30,000
15	PHOSPHORIC ACID	10	18,760	300,000	100,000	300,000
16	POLYVINYL CHLORIDE	9	18,250	0	0	0
17	BENZENE	9	4,800	20,000	9,800	12,000
18	SULFUR DIOXIDE	8	630	0	0	0
19	FORMALDEHYDE	8	2,414	340,000	120,000	466,590
20	BUTADIENE	8	3,982	470,000	170,000	93,750
21	METHYL ALCOHOL	8	3,278	2,000,000	1,000,000	1,875,000

* All substances are commodity chemicals.

** This includes all events in which the substance appears as a primary, secondary, or tertiary substance.

*** Average quantities are computed using only those events that reported quantities.

No characteristic of any substance other than its association with a large number of AHE/DB events was considered by the Committee in selecting substances for the initial list. However, the Committee did receive a communication from the Director of the Chemical Accident Prevention Staff of the Environmental Protection Agency, dated October 19, 1989 indicating that some substances association with a large number of events should not be included on the initial list. Pursuant to this communication three substances (sodium hydroxide, polyvinyl chloride and phosphoric acid) were deleted from the list of substances contained in the legislation as introduced (S. 816).

The deletion of these three substances from the list as included in the introduced bill should not be read as a decision to preclude them from the subsection (c) list permanently. The Administrator may select any of these substances for the initial list of at least 50 substances or subsequently, if the Administrator determines that they satisfy the criteria for listing.

When establishing the list of substances under subsection (c), several other lists that identify extremely hazardous substances should be considered. EPA has published a list of 360 extremely hazardous substances under section 302(a) of the Emergency Planning and Community Right-to-Know Act of 1986 (SARA title III). The State of New Jersey has published a list of 104 extremely hazardous substances under its Toxic Catastrophe Prevention Act. The European Community has identified 178 dangerous substances for priority action pursuant to the Seveso Directive for preventing chemical accidents. Although the program may begin with a more limited set of substances, each of these other lists and the criteria which were used to develop them would be appropriate for the Administrator to consider when establishing the initial list of at least 50 substances (at least 25 of which must be selected by the Administrator) and when expanding the list for future regulation. The criteria employed in developing these lists may also be useful in establishing threshold quantities.

The list of substances published pursuant to section 302 of SARA was originally compiled in 1985 by the Environmental Protection Agency as part of its revised air toxics strategy and in response to the Bhopal accident in late 1984. In November 1985, the Agency inaugurated the Chemical Emergency Preparedness Program (CEPP) which was designed to provide guidance on emergency planning to local governments. The guidance document for CEPP covered topics including organizing the community, gathering site-specific information, contingency plan development, contingency plan appraisal and so on. Included as Appendix A in the guidance document was a list of 402 extremely hazardous substances which might appropriately serve as a first screening of substances to be covered by a community emergency planning effort.

When the Congress established a national emergency planning program by law in the 1986 Superfund amendments, it incorporated the CEPP list by reference in section 302 and required EPA to set threshold planning quantities for each of the substances on the list. The owner or operator of each facility at which one of these substances is present in amounts greater than the threshold planning quantity, must notify the State and local emergency planning commissions (authorized by the same Act) of the presence of the substance. Furthermore, facilities required by OSHA to maintain or prepare "Material Safety Data Sheets" (MSDS) describing the hazards associated with exposure to chemical substances held at the facility must provide each MSDS (or a list of MSDS's) to the local emergency planning and public safety officials.

The Agency established this list and the threshold planning quantities as an interim final rule in the Federal Register on November 17, 1986 but at the same time proposed certain modifications to the list (including additions and deletions). A final rule was published in the Federal Register on April 22, 1987. Four substances were added and no substances were deleted from the original list. The Agency subsequently deleted 40 substances from the list (53 Federal Register 5574) and has recently proposed the deletion of 6 more (54 Federal Register 30700).

The preamble to the interim final rule (51 Federal Register 41570) includes a thorough discussion of the factors which the Agency took into account in listing a substance pursuant to the CEPP program. These factors are described here to indicate that they would be appropriate factors to consider when listing substances under subsection (c) of section 129.

Because there is very little data available on the toxicity of these chemicals to humans, the Agency used animal data to infer potential acute toxic effects in humans. The Agency used evidence on lethality because it represents the most immediate concern in emergency situations. Acute lethality data (acquired through animal studies) for various substances is the most commonly reported toxicity information. Lethality data from animal toxicity tests are generally expressed as the median lethal concentration (LC50) when the substance has been administered by inhalation and median lethal dose (LD50) when the substance has been adminstered orally or dermally. These data represent does levels or concentrations of a chemical that resulted in the death of 50 percent of the test animals exposed at the indicated concentration or dose level.

To identify those substances which are extremely hazardous, the Agency established the following criteria for concentration or exposure:

> Extremely hazardous substances are those defined with inhalation LC50 values of less than or equal to 0.5 milligrams per liter of air, dermal LD50 values of less than or equal to 50 milligrams per kilogram of body weight or oral LD50 values of less than or equal to 25 milligrams per kilogram of body weight. The specific values chosen are recognized by the scientific community as indicating a high potential for acute toxicity, and chemicals meeting the toxicity criteria are considered potential hazards. (51 Federal Register 41573).

Where toxicity data were not available, the Agency looked at alternative health effects information. The Agency applied the criteria described above to the substances recorded in the toxicity data base cited as the Registry of Toxic Effects of Chemical Substances maintained by the National Institute of Occupational Safety and

Health (NIOSH). The Agency selected those chemicals which met the criteria and which are known to be in production, but excluded radioactive materials, research materials, food additives, drugs and cosmetics. This process led to the identification of 379 chemicals. A number of additional chemicals which did not meet the criteria, but which had caused death or serious injury as the result of accidental releases were added to the list to bring the total to 402. (As noted above, 40 substances were subsequently deleted.)

The Agency consistently notes that the list does not include all of the chemical substances which may present an extreme hazard when released. That a chemical is not on the list does not indicate that it is safe or that it cannot be the source of death, injury or property damage due to sudden, catastrophic events.

The State of New Jersey has gone through a similar set of procedures under the Toxic Catastrophe Prevention Act (TCPA) which became effective in that State on January 8, 1986. TCPA is a program with objectives similar to those addressed here, the prevention of accidental releases of extremely hazardous substances. Facilities in New Jersey handling substances classified as extremely hazardous must register with the State, provide any hazard assessment that has been done, develop risk reduction work plans and pay a fee to support implementation of the State oversight program.

TCPA initially identified 11 extremely hazardous substances by statute, but required the State Department of Environmental Protection to expand that list. The New Jersey DEP used two criteria—volatility and toxicity to identify the chemicals to be added. The toxicity review was very similar to that conducted by EPA including the use of the NIOSH data base. This review led to the identification of 93 additional substances (bringing the total to 104) which "are atmospheric dispersive hazards, gases or volatile substances at ambient conditions with combined volatility and acute toxicity equal to or greater than those of hydrogen chloride (hydrochloric acid, 36% aqueous), a substance on the initial statutory list."

It should be noted that approximately one-half of the chemicals (50) selected by the State of New Jersey for its program are not on the SARA section 302 list. That is cause for concern, as it indicates that the list established under section 302 may have significant gaps. In selecting substances for the list required here, the Agency at a minimum is to give careful consideration to listing those chemicals identified by New Jersey which are not on the SARA section 302 list and should, in addtition, consider the methodology which New Jersey used in selecting substances as additional criteria to be applied in the Federal program.

It should be noted that the 25 substances identified in the statutory language for the initial subsection (c) list include substances which present a hazard as a result of characteristics other than toxicity and volatility. These 25 substances were selected because they were associated with events on the AHE Data Base. A large percentage of the events causing death and a substantial percentage of those recorded as causing injury on AHE/DB had catastrophic consequences because of fire or explosion, not inhalation toxicity. Although the criteria used to develop the SARA section

302(a) list and the New Jersey Toxic Catastrophe Prevention Act list have been cited to establish a foundation for listings beyond the 25 substances identified in the statutory language, the Administrator should expand upon these criteria to include criteria for listing other substances which are highly flammable, reactive or explosive.

An alternative approach to the listing function should also be considered. Rather than matching the characteristics of individual chemical substances to general criteria to determine whether the substances should be listed, the Administrator might simply promulgate the criteria and require the owner or operator of every facility handling a substance meeting those criteria to fulfill each of the requirements which would have been triggered, if the substance had been explicitly listed. This puts the burden of identifying particular substances which are extremely hazardous on the facility owners and operators. It would also assure that the "list" would be current with new developments in the chemical industry, rather than delaying action until such time as the Administrator or the Chemical Safety Board discovers the potential for damage associated with a substance as the result of a catastrophic event which might have been prevented. Although this approach is not specifically mandated under subsection (c), it is an alternative which should be considered by the Administrator and reviewed by the Board as part of the report on hazard assessments to be completed within 18 months of enactment.

The Administrator shall review and revise the list no less frequently than every five years and may add substances using criteria similar to those described below. The Administrator is not authorized to remove substances from the initial list. Any person may petition (under the Administrative Procedures Act) the Administrator to add a substance. It is expected that the Chemical Safety Board established by subsection (e) will recommend additional substances to be listed based on its investigations of chemical accidents and potential hazards.

In addition to selecting extremely hazardous substances for the list established by this subsection, the Administrator is also to set a threshold amount for each substance. Only those facilities producing, processing, handling or storing the substances in quantities greater than the threshold amounts will be subject to the reporting, hazard assessment and leak detection requirements. Generally, it is expected that these threshold amounts will be the same as the threshold planning quantities established pursuant to section 302 of SARA (when the substance appears on the section 302 list). Threshold quantities established under that authority have been based on a combined index of: 1) toxicity; and 2) the physical state or volatility of the substance. Chemicals which are very toxic and highly volatile were assigned a planning quantity of one (1) pound. At the other end of the spectrum, chemicals of low concern (generally because they are solids under ambient conditions) are assigned a planning quantity of 10,000 pounds. Intermediate categories of 10, 100, 500 and 1,000 pounds were also developed and chemicals were assigned to these intermediate threshold categories based on order of magnitude ranges for their ranking on the combined toxicity/volatility index.

The Agency has consistently indicated that these thresholds do not indicate "safe" quantities below which there is no risk of injury from an accidental release. They are merely screening levels used to establish priorities among facilities as the Federal accident prevention program is begun. It is significant that 37 percent of the injury events recorded on the AHE Data Base were associated with events where the amount of the extremely hazardous substance released was less than the reportable quantity (another threshold value established under CERCLA) contained in Federal regulations. This information (unconfirmed in other reports) is cause for concern and may indicate that threshold quantities previously established are too high and should be revised in concert with the accident prevention program authorized here.

Some have suggested exemptions from the hazard assessment requirement (described below and triggered by the listing of a specific substance under this subsection) for various classes of facilities which might be accomplished by manipulating the "threshold quantity" provisions of this subsection. The Administrator could "exempt" facilities of a specific type or size from these requirements by selecting thresholds at levels above those usually found at such facilities and perhaps higher than would otherwise be indicated by health and safety data. Such an approach is explicitly rejected, in part, on the findings of the Chemical Special Emphasis Program which was conducted by the Occupational Safety and Health Administration. In the aftermath of Bhopal, OSHA examined 40 facilities across a wide range of sizes and industries for the potential for catastrophic events. Among the most significant findings from that survey, OSHA reports that:

> Violations were far more prevalent in small and medium-sized establishments than in large ones . . . Some of the shorter ChemSEP inspections resulted in the greatest number of significant changes. These inspections were in small establishments, often older ones, that had relatively fewer resources (professional services) at their disposal. Here, inspections made the greatest difference.

It appears that small facilities may realize the greatest reduction in the potential for catastrophic events as the result of hazard assessments and other measures authorized by this section and, thus, an exemption or modification for facilities of a particular type or size from these requirements should not be a factor which the Administrator considers when selecting threshold quantities for listed substances.

Hazard Assessment.—Subsection (d) of the new section 129 requires the owner or operator of each facility producing, processing, handling or storing an extremely hazardous substance listed under subsection (c) in more than threshold amounts to conduct and make available a hazard assessment. A hazard assessment is a formal description of process malfunctions or equipment failures that may result in an accidental release causing a death, serious injury or substantial property damage. The assessment identifies the equipment or processes which may fail, the magnitude of the release which may result, the impacts of the release on persons and property, and may indicate the probabilities associated with each of several likely outcomes (including the worst case scenario).

It is likely that many of the facilities subject to this requirement have already conducted hazard assessments. The chemical industry itself has been conducting a Community Awareness and Emergency Response (CAER) program. The handbook for CAER indicates that a "plant risk evaluation" and an "area risk evaluation" are important elements of a complete emergency response plan. Combined, these evaluations are not unlike the hazard assessment required here. Third, hazard assessments are becoming routine in light of the risk reduction requirements now imposed by insurance carriers who underwrite pollution liability insurance for the chemical industry.

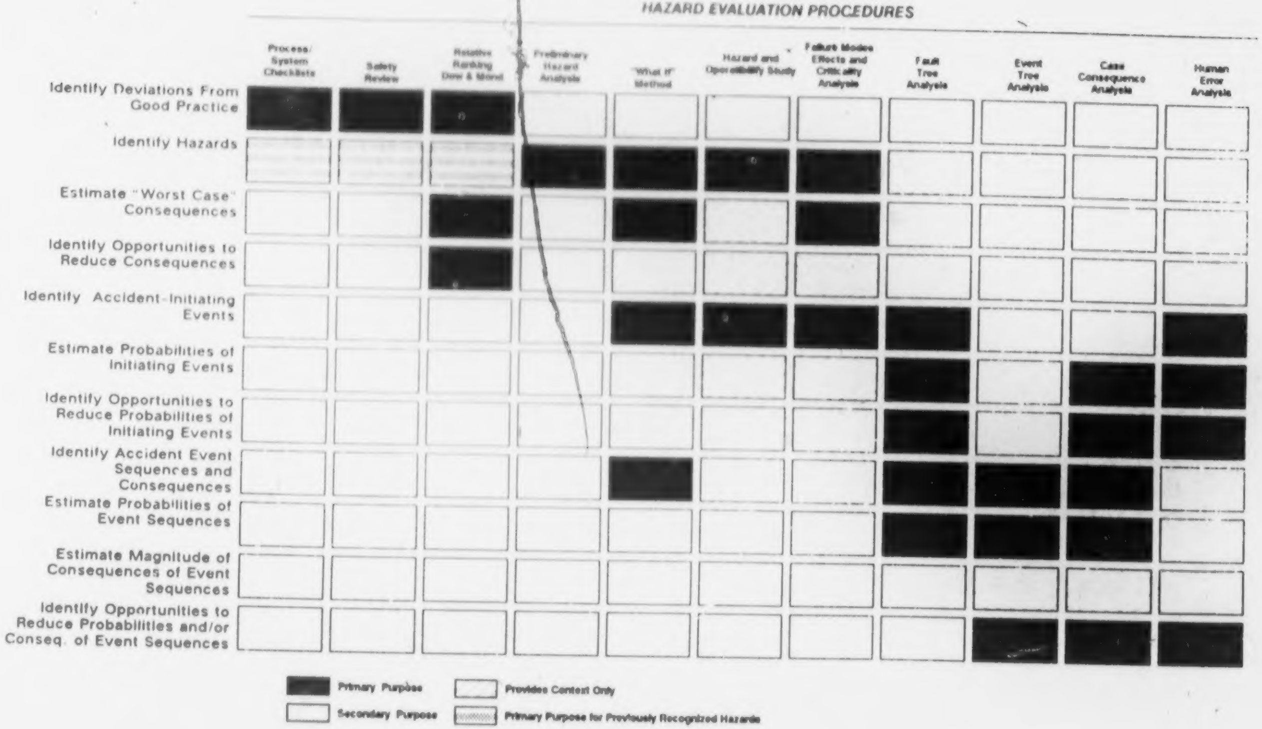
Facilities at which any of the 50 extremely hazardous substances initially listed by the Administrator are present in amounts greater than the threshold quantity must complete the hazard assessment within 36 months of the enactment of this legislation (12 months after the Administrator completes the listing process). For facilities handling substances which are subsequently listed by the Administrator, the assessment must be prepared within 12 months of listing. The assessment must fully cover each of the listed substances (if more than one is present at the facility) and must be updated every 2 years.

There are two principal objectives that will be served by this statutory requirement to prepare hazard assessments: 1) to identify the points of weakness in the containment and protection systems of the facility so that further measures to prevent accidents (and mitigate their consequences, when they do occur) can be instituted; and 2) to identify and anticipate the consequences of the most likely and the worst case accidents so that the community in which the facility is located can adequately prepare an emergency response for a potential sudden, accidental release. These prevention and protection measures may be taken by the facility owner or operator, requested or required by State and local emergency planning and public safety officials, recommended by the Chemical Safety Board established by subsection (e), or required through rule or order by the Administrator pursuant to subsection (f) or (h) of the new section 129.

Hazard assessments will be conducted in accordance with guidance issued by the Administrator. That guidance may draw from recognized hazard evaluation techniques including elements of any of the 11 different techniques described by the American Institute of Chemical Engineers (AIChE) in the published report "Guidelines for Hazard Evaluation Procedures." Figure III-12 taken from the EPA report, "Review of Emergency systems," summarizes the major elements of the eleven hazard evaluation techniques recognized by AIChE. The applicability of various techniques at specific facilities depends on the size and complexity of the facilities and the risks presented by the processes and substances present.

Figure III-12

Hazard Evaluation Procedures



HAZARD EVALUATION PROCEDURES

	Process/ System Checklists	Safety Review	Relative Ranking Dow & Mond	Preliminary Hazard Analysis	"What If" Method	Hazard and Operability Study	Failure Modes Effects and Criticality Analysis	Fault Tree Analysis	Event Tree Analysis	Case Consequence Analysis	Human Error Analysis
Identify Deviations From Good Practice	■	■	■	□	□	□	□	□	□	□	□
Identify Hazards	▨	▨	▨	■	■	■	■	□	□	□	□
Estimate "Worst Case" Consequences	□	□	■	□	■	□	■	□	□	□	□
Identify Opportunities to Reduce Consequences	□	□	■	□	□	□	□	□	□	□	□
Identify Accident-Initiating Events	□	□	□	□	■	■	■	■	□	□	■
Estimate Probabilities of Initiating Events	□	□	□	□	□	□	□	■	□	■	■
Identify Opportunities to Reduce Probabilities of Initiating Events	□	□	□	□	□	□	□	■	□	■	■
Identify Accident Event Sequences and Consequences	□	□	□	□	■	□	□	■	■	■	□
Estimate Probabilities of Event Sequences	□	□	□	□	□	□	□	■	■	■	□
Estimate Magnitude of Consequences of Event Sequences	□	□	□	□	□	□	□	□	□	□	□
Identify Opportunities to Reduce Probabilities and/or Conseq. of Event Sequences	□	□	□	□	□	□	□	□	■	■	■

■ Primary Purpose
□ Secondary Purpose
□ Provides Context Only
▨ Primary Purpose for Previously Recognized Hazards

Source: The Center for Chemical Process Safety, American Institute of Chemical Engineers. Guidelines for Hazard Evaluation Procedures. Prepared by Battelle Columbus Division. New York, New York, 1985.

Hazard assessments are to be conducted by knowledgeable persons with access to process safety information for the facility. The assessment is to be summarized in a written report which may contain findings and recommendations with respect to the operations at the facility. The findings of the assessment should be communicated to those with day-to-day control over the operation of the facility and representatives of employee unions. Assessments for new process units should be completed before the units commence operation. Each update should review all changes made since the previous assessment and should be conducted before any major process modification is operational.

Hazard assessment is by now well-understood with a developing consensus on the basic elements. The bill identifies nine elements which the Administrator is to include, as appropriate, in guidance on the hazard assessments required by this subsection. These elements are taken from work done by the Advisory Committee on Major Hazards and the Health and Safety Executive, both agencies of the British government.

The first of the nine elements (described in subparagraph (A) of subsection (d)(2)) assures collection of basic information on the facility, its operations and the characteristics (both physical and human) of the community in which it is located. The intent here is to acquire a fundamental understanding of the plant, its control and safety systems, the operating conditions and practices, emergency procedures, and the leak detection, monitoring and maintenance (safety audit) programs at the site. A site visit will be necessary to gather this information.

Included in the information gathered under subparagraph (A) will be the precise longitude and latitude of each of the units at the facility which has the potential for catastrophic release. Both the Federal Emergency Management Administration and the Environmental Protection Agency are developing computerized mapping systems to be used in emergency planning and risk reduction and both systems require precise longitude and latitude data to enter facility-specific information into the system as a potential point of release.

The information gathered under subparagraph (A) will also include basic data on the community in which the facility is located. Information such as the location of residential areas (population density), major community facilities, geographical features which may affect plume movement, and the meteorological conditions which may prevail at the site are important elements of the data base.

Subparagraph (B) calls for an identification of each of the components of the facility (including, but not limited to, storage vessels, process vessels, pipework, transfer couplings, other fittings, pumps, vents, scrubbers, valves, etc.) from which a release of an extremely hazardous substance is possible. In chemical plants, each vessel and pipe run is to be considered in turn and release rates and durations for each of the possible events is to be estimated. This systematic examination of each potential point of release produces a list of vapor (and liquid) generation rates and durations.

The third element includes an identification of any previous releases of any extremely hazardous substance from the facility and the frequency and duration of such releases. The purpose of this information requirement is to aid in the calculation of release probabilities and the consequent risks of various adverse effects occurring.

Subparagraph (D) requires identification of the range of possible releases (including worst case events) which may occur to establish the size, concentration and duration of any potential release as it would move outside the property boundaries of the facility and into the community. The work product is a series of plume maps which illustrate the areas of the community potentially affected, the concentration of potential plumes at various locations and the likely duration of human exposure. British hazard assessment procedures consider exposure both to persons out-of-doors and to persons indoors (as the result of air exchange from the building to the ambient environment).

Subparagraph (E) requires a description of the possible consequences of each potential accident scenario. This is the primary purpose of the hazard assessment. Key questions must be answered: Who would be exposed? At what concentration? And for how long? This term provides a description of the adverse effects (deaths, injuries, property damage) which might result from a sudden, catastrophic release of an extremely hazardous substance. It defines the outside limits and potential scenarios for the emergency planning effort to be undertaken by the public safety officials of the local community.

Subparagraph (F) adds quantitative information to the evaluation of the consequences. It is widely acknowledged that risk estimate procedures used in hazard assessments cannot provide precise statements of the probability of various adverse effects. But not all process malfunctions or equipment failures are equally likely and climate conditions at the time of the accident will have determinative effect on the areas of the surrounding community which experience exposure to an extremely hazardous substance.

Quantitative assessments taking these variables into account allow the local emergency planning committees to compare the relative likelihood of the threat as between various release scenarios and set priorities for the development of response plans. However, considering the highly uncertain nature of these estimates, very low risk estimates reported pursuant to subparagraph (F) should not, of themselves, cause a community to forego emergency planning which would have been indicated by the qualitative descriptions developed pursuant to subparagraph (E).

The seventh element requires that the hazard assessment contain information on the toxicity of the extremely hazardous substances which may be released. Pursuant to this authority facility owners and operators may be required to gather additional health and environmental effects information on any of the extremely hazardous substances handled at the facility.

Subparagraph (H) requires a review of the various release prevention and protection systems that might be installed at the facility to reduce the risk of sudden, catastrophic releases. This review should be conducted in the context of industrial consensus and safety codes; equipment and practices available at other facilities known to the owner or operator; recommendations of the Chemical

Safety Board established by subsection (e); and rules and orders issued by the Administrator (both to the specific facility and others of a similar type) pursuant to subsections (f) and (h).

Finally, the guidance of the Administrator shall require, as appropriate, a sensitivity analysis, that is, a test of the assumptions to determine whether the qualitative or quantitative assessments would be significantly different if values for basic variables (release rate, concentration, duration, windspeed, vaporization, etc.) were other than predicted (because the original value or range of the assumptions was incorrect).

Railroad right-of-way is explicitly excluded from the definition of facilities for which hazard assessments are required. However, the Administrator is given the discretion to include railroad yards where rolling stock containing extremely hazardous substances is frequently located. Evidence submitted to the Committee indicates that 1,000,000 car loads containing extremely hazardous substances are transported by the railroad industry each year. During the period 1982 to 1987 there were 84 rail yard accidents in which hazardous materials were released, an average of 14 per year.

To the extent that comparable requirements for hazard assessment are imposed on similar facilities by the Occupational Safety and Health Administration, the Administrator is to coordinate the hazard assessment requirements imposed here with any such regulation. Although the agencies have not worked closely on these issues in the past, benefits both to the Government and to the regulated community may result from fuller cooperation in the future.

This is not authority for the Administrator to delegate the responsibilities of the Environmental Protection Agency under this section to OSHA. The Administrator is to promulgate guidance for hazard assessments. However, that guidance should be developed in cooperation with any similar program which OSHA may be considering. The Administrator is to assure that off-site impacts of accidents are fully identified in such regulations, that hazard assessments be available to the public as provided under the provisions of the Clean Air Act and the Emergency Planning and Community Right-to-Know Act of 1986 and that any rules jointly developed are not preemptive of State or local regulations which may be more stringent.

To minimize the paperwork burden of the hazard assessment requirement on small business and governmental entities, the Administrator is authorized to develop special hazard assessment tools for the use of small entities. These tools may include checklists, workbooks, computer software and training courses for individuals who will be conducting the hazard assessments. Some concern has been expressed with respect to the economic impact of these requirements on small businesses and government agencies. Costs in the range of $20,000 to $40,000 per listed substance at each facility have been projected. These costs can be substantially reduced for small entities which experience potential hazards similar to those at many other facilities through the development of generic assessment methods. Retail firms, specialty chemical distributors, farm cooperatives, drinking water systems and other small business and governmental entities would be greatly assisted by technical assistance from the Agency in preparing hazard assessment methods which can be replicated with relative ease at a large number of facilities. The Agency is to work with trade associations and other business organizations representing these entities to develop these methods keeping in mind the purposes which are to be served by the hazard assessments that are required here.

The legislation provides for wide availability of the completed hazard assessments to assure that the information contained will be used in emergency planning and prevention programs. The assessments are to be available to the Administrator, the Chemical Safety Board established by subsection (e), the State in which the facility is located, and to any emergency planning committee or public safety agency responsible for emergency planning or actual response with respect to a release from the facility and representatives of employee unions. The asessments will also be available (for a charge not to exceed the legitimate cost of printing) to the general public subject to the confidential business information provisions of the Emergency Planning and Community Right-to-Know Act of 1986.

The Administrator is to propose guidance on the preparation of hazard assessments within 12 months of the enactment of this legislation. Final guidance is to be promulgated within 24 months of enactment. The first hazard assessments are to be prepared by facility owners and operators within 36 months of enactment. The guidance may include information on parameters (concentrations, durations, failure probabilities) for various substances, processes and failure scenarios to be used in the development of hazard assessments. The Chemical Safety Board authorized by subsection (d) of the new section 129 of the Act is to prepare a report for the Administrator on the use of hazard assessments in preventing accidents and mitigating their effects including any recommendations which the Board may find appropriate. This report is due 18 months after enactment and may include recommendations with respect to chemicals for which hazard assessments should be prepared and elements which might appropriately be included in such assessments.

The Administrator is also to establish a program of long-term research to develop and disseminate information on hazard assessment methodologies and techniques including establishment of the appropriate parameters and statistical assumptions to be used in such assessments. This research will include activities at the spill test facility operated by the Department of Energy to validate assumptions on the concentration, duration and dispersion of plumes of extremely hazardous substances which may be released through catastrophic events. Recent research indicates that toxic clouds may be 10 to 100 times more concentrated than previously assumed. There is significant evidence (see Ronald P. Koopman, Donald L. Ermak, and Stevens T. Chan, "A Review of Recent Work in Atmospheric Disperison of Large Spills," AIChE 1988 Hazardous Materials Spills Conference) to indicate that dense clouds of extremely hazardous substances may behave in ways substantially different from (and implying a greater threat of adverse effects than) the assumptions which are included in many of the models used for hazard evaluation currently. The Administrator is to assure that assumptions used in such models reflect as nearly as possible the true behavior of vapor and liquid/vapor releases which actually occur both by supporting research in this area and by disseminating the results of such research. The research program will also include testing of containment systems and emergency relief systems commonly in use to determine whether they perform as expected.

The requirement to perform a hazard assessment applicable to facilities handling extremely hazardous substances in more than threshold amounts may be enforced by the Administrator with the authorities of section 113 of the Clean Air Act.

Chemical Safety Board.—Subsection (e) of the new section 129 establishes an independent safety board, to be known as the Chemical Safety and Hazard Investigation Board, which is to investigate accidents resulting from the production, processing, handling or storage of chemical substances causing death, serious injury, or substantial property damage (including damage to natural resources).

The new chemical safety board is modeled on the structure, activities and authorities of the National Transportation Safety Board (NTSB), an independent Federal agency which investigates accidents in the transportation industry (aviation, railroads, pipelines, highway and marine transportation). The antecedents of the NTSB go back to the Air Commerce Act of 1926 which created an independent agency to investigate, record and make public the causes of accidents in the rapidly growing commercial aviation industry. Through several reorganizations, including the Federal Aviation Act of 1958 (which firmly separated the rule-making and investigatory functions in aviation safety programs) and the organization of the Department of Transportation in 1966, the Bureau of (Aviation) Safety has generally been a 5-member, quasi-independent entity charged with determining the cause or probable cause of fatal air crashes in commercial and general aviation and recommending measures to a regulatory authority (the Federal Aviation Administration) that might prevent similar accidents in the future.

The Independent Safety Board Act of 1974 established the current NTSB which also has investigatory responsibilities in other transportation sectors. The NTSB does not, itself, impose safety requirements on the transportation industry; its function is investigatory. The NTSB now functions with approximately 350 FTEs and an annual budget of approximately $25 million. Many of the issues raised in the following discussion reflect lessons learned during the long history of the Federal effort to improve the safety of air travel by supporting an independent and expert safety board to investigate serious accidents, to determine the probable cause or causes of such accidents and to recommend improvements in equipment, training or procedures which, when required of those in the industry, might reduce accidents and fatalities.

The Chemical Safety Board established by the bill is to have three members. All three Board members including a chairperson, who will also be the chief executive and administrative officer of the Board, are to be nominated by the President and confirmed by the Senate. The members are to have demonstrated technical expertise in professional fields related to accident investigation including accident reconstruction, safety engineering, human factors, chemical safety, toxicology or chemical regulation. In selecting Presidential nominees for the Board, special emphasis should be put on expertise in "human factors" and the role that operator failures play in causing accidents. In other fields, the United States Government has fallen behind the international community in the use of operator training and the development of operating and emergency procedures to prevent accidents and minimize their consequences.

The Board members will serve for a term of five years. They may be reappointed and may continue in office (after the five-year period) until a successor is appointed. The Board is given the power, subject to civil service laws, to hire staff including investigators, attorneys, and administrative law judges. The chairperson of the Board is given authority for directing the work and assignments of the staff except that each Board member shall be assigned such personal staff as are necessary to carry out responsibilities of a member. The chair's conduct of the executive function is subject to oversight by the Board as a whole.

The President may remove any member of the Board from office, if the President finds that such person is guilty of inefficiency, neglect of duty, or malfeasance in office.

The Board will operate by majority vote, but may (by vote) delegate responsibilities to the chairperson or other member, except that it shall require a majority vote of the full Board to issue a report on the cause or probable cause of an accident, make a recommendation to the Administrator or the head of another Federal agency, or promulgate a rule.

The independence of the Board in its official duties (finding the cause or probable cause of chemical accidents and recommending requirements or orders which will prevent accidents in the future) is essential for several reasons. First, it is unlikely that an agency charged both with rule-making and investigating functions would be quick to acknowledge that existing requirements were insufficient to prevent an accident. In fact, the investigations conducted by agencies with dual responsibilities tend to focus on violations of existing rules as the cause of the accident almost to the exclusion of other contributing factors for which no enforcement or compliance actions can be taken. The purpose of an accident investigation (as authorized here) is to determine the cause or causes of an accident whether or not those causes were in violation of any current and enforceable requirement. When the causes are fully understood, that understanding may then be used to modify requirements to reduce the possibility of recurrence.

Second, the Board is intended as an organizational stimulus to an appropriate amount of regulatory activity by the Environmental Protection Agency in this area. Subsection (f) of the new section 129 gives the Administrator authority to issue requirements to prevent accidents (and mitigate their consequences) at facilities handling extremely hazardous substances. Were this authority completely discretionary, there is some doubt whether the Agency would use it at all. It may have been possible to stimulate use of the accident prevention authority with a series of specific statutory directives including deadlines for the promulgation of regulations, a list of devices or facilities to be covered, a menu of specific hazards to be addressed, and so on. However, that degree of specificity in statutory language might be counterproductive at this point in the development of Federal accident prevention authorities. As an alternative, the Board is created as an independent source of expertise which may make recommendations for rules and orders to the Administrator. These recommendations may include a schedule for implementing the proposed actions. The Administrator is required to make a formal, public response to each recommendation. A Board which did not operate independent from the Administrator's direction would defeat the objective of stimulating regulatory action—a stimulus created through the organizational tension built into the statutory relationship between the Board and the Agency.

The independence of the Board was strengthened by amendments adopted during Committee markup. Introduced legislation (S. 816) authorized a five-member board with two members appointed by the Administrator of the Environmental Protection Agency and two members appointed by the Secretary of Labor. Only the chairperson would have been appointed by the President and confirmed by the Senate. As reported, the bill authorizes a three-member Board with all three appointments made by the President and confirmed by the Senate. In addition, the reported bill includes new language assuring that reports and recommendations prepared by the Board are not subject to review or modification by other Federal officials (including the Administrator or any official of the Office of Management and Budget) before they are released to the public. These amendments to the introduced legislation were made to assure that the official actions of the Board would be considered and taken independently and not at the direction of other Federal agencies or officials.

For purely administrative purposes, the Board is to be located within the Environmental Protection Agency and will, thus, be able to use the accounting and personnel mechanisms of an established Federal entity. This will assure a more rapid startup of the Board as an operating agency and avoid many of the difficulties with respect to space, hiring authority and disbursement of funds which new agencies typically face when first established.

The Board has five enumerated duties:

(1) to investigate serious accidents which result from the production, processing, handling or storage of chemical substances and report in writing on the cause or probable cause of each accident;

(2) to make recommendations to the Congress, other Federal agencies, State and local governments and entities in the commercial and industrial sector on steps that can be taken to reduce the likelihood or consequences of chemical accidents including the proposal of specific rules and orders to be issued by the Administrator or the Secretary of Labor to prevent or minimize the consequences of chemical accidents;

(3) to establish requirements for reporting accidents including measures to preserve evidence which may substantiate the cause or probable cause of the accident;

(4) to conduct general studies and investigations where there is evidence of a potential hazard to human health or property as the result of accidental releases; and

(5) to review and make recommendations on the role of hazard assessments and risk management plans in preventing chemical accidents.

The principal role of the new chemical safety board is to investigate accidents to determine the conditions and circumstances which led up to the event and to identify the cause or causes so that similar events might be prevented. The accidents which the Board is to investigate are those which result from the production, processing, handling or storage of a chemical substance (not limited to the extremely hazardous substances listed under subsection (c)) which result in a death, serious injury, or substantial property damage.

The Board is to enter into a memorandum of understanding (MOU) with the National Transportation Safety Board which establishes the NTSB as the lead agency with respect to the investigation of chemical accidents in the transportation sector. The MOU shall assure that the responsibilities of the (chemical safety) Board are fulfilled and shall not diminish in any way the jurisdiction or responsibility of the NTSB for transportation related accidents. There should be no conflict between the interests of the two agencies in this respect.

The Committee received a communication from the Chairman of the National Transportation Safety Board, the Honorable Jim Burnett, dated February 18, 1988, further outlining the relationship between the NTSB and the new (chemical safety) Board. Mr. Burnett's letter cited the following statutory language giving NTSB primary authority for transportation accidents:

> Any investigation of an accident conducted by the Board under this paragraph (other than subparagraph (E)) should have priority over all other investigations of such accident conducted by other Federal agencies. The Board shall provide for the appropriate participation by other Federal agencies in any such investigation, except that such agencies may not participate in the Board's determination of the probable cause of the accident. Nothing in this section impairs the authority of other Federal agencies to conduct investigations of an accident under applicable provisions of law or to obtain information directly from parties involved in, and witness to, the transportation accident. The Board and other Federal agencies shall assure that appropriate information obtained or developed in the course of their investigations is exchanged in a timely manner. (49 U.S.C. 1903(a)(1))

It is important to note that this statutory provision specifically preserves the authority of agencies other than NTSB, like the (chemical safety) Board created here, to investigate accidents which are transportation-related to the extent that they have such authority under other law—authority which would be established for the Chemical Safety Board by the proposed section 129 of the Act. As noted above, the phrase "producing, processing, handling or storing an extremely hazardous substances" used throughout this section is to be read in the broadest way to include the transportation of such materials from one site to another. Mr. Burnett's letter further describes the potential relationship between the NTSB and the (chemical safety) Board as follows:

> Where information is relevant to both the Safety Board (NTSB) and the CSHIB (Chemical Safety and Hazard Investigation Board), the CSHIB would have access promptly to the data acquired by the Safety Board without subjecting persons who possess the data to multiple requests for the same information from different Federal agencies. To the extent that the CSHIB needs information that is not germane to the Safety Board's investigation, the CSHIB would be free to acquire the information directly.

The (chemical safety) Board is not precluded from seeking information directly from parties involved in an accident which is in the primary jurisdiction of the NTSB and is being investigated by that agency, whether that information is germane to an NTSB investigation or not. However, whenever possible, the (chemical safety) Board should rely on information collected by NTSB rather than conduct separate information-gathering activities.

The role of other parties in accident investigations conducted by the Board may be established by regulation. In the case of chemical accidents many parties will be present during the initial stages of an investigation. Generally, the owner or operator of the facility, union representatives, local emergency response and public safety personnel, and representatives of State and Federal agencies with enforcement responsibilities will be onsite in the period immediately after an accident. All of these parties have legitimate functions which warrant their presence on the scene.

However, questions arise when representatives of possible claimants or insurers seek access to the accident site. Under other authorities (aviation) such parties have been prevented from entering accident sites during the conduct of the governmental investigation. Such exclusion is not provided for here. To further protect the rights of those who may suffer injury or loss as the result of chemical accidents, the Board is instructed to carefully preserve the evidence it gathers as it may be relevant for use in later litigation. Further, the Board is directed to conduct its investigation (including laboratory testing of materials and equipment involved in an accidental release) so as not to jeopardize such proceedings. This is not, however, an instruction to the Board to conduct its own investigations in a manner which facilitates the use of its findings in other proceedings to determine fault or liability. In most cases the standard of evidence in the Board's proceedings will be less rigorous than that required in a court of law.

The findings, conclusions and recommendations of the Board are not to be used in civil proceedings for damages which result from an accident investigated by the Board. In conducting its investigations, the Board will need the fullest cooperation from facility owners and operators, equipment suppliers and other parties involved in an accidental release to determine the probable causes of the event. The likelihood that conclusions drawn from information provided to the Board will be used in a suit from damages will discourage full cooperation. Furthermore, and as noted above, the standard of evidence used by the Board in reaching its determinations of probable cause is likely to be less rigorous than evidentiary standards used in a civil proceeding and thus a conclusion, finding or recommendation of the Board should not be given the same weight as other evidence in such a proceeding.

The Board is encouraged to participate in the investigation of accidents which occur at facilities located in other nations, both to contribute its own expertise to a determination of the cause or probable cause, and also to gain insight and experience which may be useful in preventing accidents or minimizing their consequences with respect to events or facilities of a similar type located in the United States. To the extent that participation would be inhibited by "sunshine" laws, including the Freedom of Information Act, which are applicable to the Board's U.S. operations, it shall develop mechanisms that may facilitate participation in foreign investigations which are not inconsistent with FOIA, but which also do not unnecessarily divulge information that would be held confidential in the nation in which the accident occurred.

The Board is given authority to conduct hearings, subpoena witnesses and compel testimony, and to administer oaths in the conduct of its accident investigations. These hearings will generally be recommended to the Board by investigatory staff, will be conducted by administrative law judges employed by the Board, and will be conducted according to the Administrative Procedures Act. The Board may collect written information for the same purpose by order directed to any person engaged in the production, processing, handling or storage of chemicals on matters which are pertinent to the investigation of an accident. An officer or employee of the Board may conduct an inspection and take samples (including samples of substances present in processes or releases) at any facility where an accidental release causing a fatality, serious injury or substantial property damage has occurred. These authorities to conduct hearings, gather information, and conduct inspections are to be construed in the broadest way so as to facilitate the activities of the Board and the objectives of this Act. The Administrator is authorized to use the information gathering authorities of section 114 of the Act to conduct any study or enforce any rule or order which is in furtherance of the objectives of this section.

The role of members of the Board in actual accident investigations is not specified. They may, of course, be present at the scene of an accident, at evidentiary hearings and in other proceedings. The precise role that each member takes in these activities will be the prerogative of the member and will depend on his or her expertise and the division of responsibilities within the Board.

The purpose of the investigation is to determine the conditions and circumstances which led up to the accident and to identify the cause or probable cause. It is not the role of the Board to apportion blame or to fix liability; that is the responsibility of a court of law. Rather, the Board is to identify those actions, omissions, events, and conditions (or combination thereof) which led to the accident or incident for the purpose of recommending modifications to processes, equipment, and procedures to prevent similar accidents or incidents in the future. The Board should take on "all cause" theory in discharging its investigatory duties. It is not the single, necessary or sufficient cause which is to be the focus of the Board's inquiry, but all circumstances which contributed to the accident (and which may effectively be modified to improve safety) are circumstances of concern. "Multiple causation" is, in fact, the norm and it is expected that the Board will follow many strands of inquiry in response to each accidental release. When stating its conclusions on cause or probabler cause it is not expected that the Board will accuse any party or fix fault. Rather, and to the extent practical, the Board is to give a precise and factual statement of why the event occurred. It is to be understood that the Board's report may not absolutely identify the cause (when insufficient information is available) and may include statements which indicate only the probability that a particular factor contributed to the outcome (e.g., "in all likelihood", "may have been an influencing factor", etc.). It is to be emphasized again that the purpose of the Board's investigation is not to buttress the case for a remedy to those injured or suffering loss by allocating liability, rather it is to provide remedy for the community as a whole by identifying those factors which caused the accident and which may be modified to prevent a recurrence.

The Board is required to issue a report on each investigation it conducts which will describe the event and identify the cause or probable cause. These reports are a statement of the Board (not staff) and are to be issued on a majority vote of the Board and should be issued in a timely manner, usually within 6 months of the accident unless a prolonged investigation of contributing causes is necessary. To assure quality in the report, the Board may wish to establish a procedure which allows for publication of a preliminary staff draft report, followed by a period of public comment, before the Board votes on the final report. In the compilation of materials which lead up to a report, the Board will establish a public docket for each investigation which will include field reports, factual summaries prepared by staff, communications, and the comments of interested persons or parties to the investigation.

Based on its investigation and report, the Board is to make recommendations to the Administrator with respect to rules and requirements which may be promulgated under subsection (f) of the new section 129 and administrative orders which may be issued under subsection (h) of this section to assure the safe operation of facilities producing, processing, handling or storing chemical substances. These recommendations may also include proposals to list chemicals as extremely hazardous substances under subsection (c). To the extent possible, the Board will make its recommendations in the form of a proposed listing, rule or order. The recommendation may include a schedule for the issuance of and compliance with the rule or order.

No specific compliance deadline is established under subsection (f) for the accident prevention requirements promulgated by the Administrator. Generally, requirements which only mandate changes in procedure (for instance updating process safety documentation at the time of any facility modification) can be implemented by both new and existing facilities almost immediately. However, other changes which involve capital investment or the development of specialized programs may require more time to implement at existing facilities. The Board should generally include in its recommendations for proposed rules a compliance schedule which reflects these considerations. In this regard, section 112 of the Clean Air Act requires existing facilities to be in compliance with emissions standards within three years. The Board may consider a longer period where it would be justified by the need to acquire permits or implement substantial modifications to plant and equipment. In some instances, other provisions of the bill provide up to four years for the most extensive capital retooling. New facilities shall be in compliance with all requirements under this section before they commence operation.

The Administrator is to respond to recommendations of the Board within 180 days of receipt. The Administrator's response is to be written and will indicate whether the recommendation will be implemented in full, in part or not at all. If the Administrator chooses not to implement some part or all of the recommendation or if it will be implemented but not according to the schedule recommended by the Board, the Administrator will explain in writting why the recommendation will not be fully implemented.

The Board may also make recommendations to the Secretary of Labor with respect to the use of authorities which the Secretary may have under the Occupational Safety and Health Act to prevent accidental releases. There is no requirement that the Secretary respond to such recommendations within a specific period of time.

The Board may conduct other and more general investigations in furtherance of the purposes of this section. The Board may conduct such studies in cooperation with other entities including Federal and State agencies, industry and trade groups and non-profit and public interest organizations. In particular, the Board should cooperate closely in the work of the National Spill Test Facility operated by the Department of Energy.

The Board may also conduct investigations and studies at sites where any of the 360 chemicals listed pursuant to section 302 of the Emergency Planning and Community Right-to-Know Act of 1986 or other extremely hazardous substances are present, whether or not an accident has occurred when there is evidence of a hazard or potential hazard. The Board may also issue more general reports to the Congress and make recommendations to other Federal or State or local agencies and to owners and operators of facilities engaged in chemical production or handling to suggest measures that might be taken to improve the safety of operations.

The Board is to be actively involved in the preparation and use of hazard assessments required under subsection (d) of section 129. Because of its expertise the Board will be uniquely qualified to suggest procedures for the conduct of hazard assessments which will contribute to the identification of potential accident scenarios and definition of the likely effects. The Board is to prepare and transmit to the Administrator within 18 months of enactment a report including recommendations on the role of hazard assessments in preventing chemical accidents. In preparing such report, the Board shall consider which substances it believes should be listed pursuant to subsection (c) and the elements of hazard assessment which are most appropriate for facilities of various types. The report is also to consider the role of risk reduction plans as may be required under subsection (f). The Board is to periodically revisit these questions and is to revise its previous recommendations as appropriate taking into account new information which has become available since the previous review.

The Board shall establish regulations for the prompt reporting of accidental releases which are subject to its investigatory jurisdiction. These reporting requirements may be coordinated with other reporting requirements established by the Agency (for instance, under section 103 of CERCLA). These rules shall also provide for the preservation of evidence at the site of the accident so that the Board may properly conduct an investigation to determine the cause or probable cause when its representatives arrive at the site of the accident.

The regulations of the Board for accident reporting may provide that any person directed to make a report contact the National Response Center rather than the Board directly. This will assure coordination of such reports with responsibilities under the Comprehensive Environmental Response, Compensation and Liability Act, the Clean Water Act and the Hazardous Materials Transportation Act. If the National Response Center is to be the initial point of contact under such rules, then the Board shall assure that officials at the National Response Center promptly notify the Board or its officers whenever an accidental release requiring an investigation has occurred.

Requirements imposed under subsection (e) with respect to reporting may be enforced by the Administrator using the authorities of section 113 of the Clean Air Act.

The Board is given authority to promulgate administrative rules as may be necessary to carry out its functions. These will include rules for the conduct of field investigations and hearings.

The Board is to receive administrative support from the Administrator of the Environmental Protection Agency in establishing facilities and managerial and accounting functions.

Information collected by the Board in an investigation or study is subject to the same trade secret protection afforded other informaton gathered by the Environmental Protection Agency under the Clean Air Act. Although protection may be provided, it must be formally requested in writing by the person whose competitive position may potentially be damaged and is only subject to protection at the direction of the Board through case-by-case determinations. In no event shall a request for trade secret protection interfere with the Board's duty to investigate an accident, determine the cause or probable cause and report to the public the results of the investigation including the sequence or events which led up to the accident and the cause or causes. No information as to the release or emissions from a facility (including the chemical name of the substance released) shall be afforded trade secret protection.

Reports and recommendations of the Board are not to be subject to prior review by other officers or agencies of the Executive Branch. To assure the independence of the Board, it is required to transmit any report, recommendation, budget request, Congressional testimony or other document to the appropriate Committees of the House and Senate at the same time that such documents are transmitted to any other officer in the Government. Employees of the Board are not subject to the direction of officers in any other department or agency.

The Board is to report annually on its activities to the President and to the Congress. The report shall include:

(1) a review of the accident investigations conducted during the previous fiscal year;

(2) a summary of the recommendations including proposed rules or orders made by the Board as the result of such investigations;

(3) an accounting of the actions taken by the Administrator of the Environmental Protection Agency in response to recommendations of the Board during the previous fiscal year;

(4) a list of the recommendations by the Board which have not been acted upon by the Administrator;

(5) recommendations for legislation or regulatory changes which would prevent or mitigate accidents; and

(6) a description of the future research program of the Board.

Subsection (e) includes an annual authorization of $12 million for each of the fiscal years 1990 through 1994 to carry out the duties assigned to the Board.

Accident prevention.—Subsection (f) of the new section 129 provides the Administrator with authority to promulgate regulations to prevent, detect and correct accidental releases from all devices and systems at facilities which manufacture, store or process extremely hazardous substances including those listed pursuant to subsection (c) in more than threshold amounts. The Administrator may list substances with respect to which the regulations will apply at the time requirements are promulgated (if the substances have not been listed previously under subsection (c)) or may promulgate general requirements applicable to facilities handling substances not listed under subsection (c).

The authority provided here is to be broadly construed. It is intended to allow the development and implementation of requirements that will prevent the sudden, accidental release of extremely hazardous substances and to mitigate the hazard presented should a release occur. Authority to prevent routine process releases (including small leaks and drips or normal process vents) of air pollutants which may cause chronic adverse health effects or acute effects which are not life threatening is provided under section 112.

The requirements issued under this subsection shall apply to any and all devices and systems used to produce, process, handle or store extremely hazardous substances. Examples of the type of requirements that might be promulgated are listed and include "monitoring, record-keeping, reporting, training, vapor recovery, secondary containment and other design, equipment, work practice and operational requirements."

The authority to issue accident prevention requirements is not linked to the listing of substances under subsection (c). The only provisions which are mandatory upon the listing of a substance are the hazard assessment required by subsection (d), the leak detection requirements established by subsection (g) and the reporting requirements to be included in any State program approved under section 112. Considering the history of section 112, it is apparent that mandating comprehensive regulations applicable to all facilities handling a substance shortly after it is listed serves only to discourage the listing of the substance.

It is to be noted that the Chemical Safety and Hazard Investigation Board may recommend to the Administrator various requirements to be promulgated under authority of this section. The principal function of the Board is to establish a foundation for regulatory action that will trigger rule-making on an appropriate schedule without prescribing the exact content and deadlines for various rules in the statuory language.

The legislation might have directed the Administrator to issue release prevention, detection and correction regulations for specific industries or extemely hazardous substances by a date certain as has been done frequently in other environmental statutes. That is the "prescriptive" path and it has benefits when an environmental problem is well understood and there is consensus on the measures which should be applied to achieve a solution. Regulatory deadlines allow the Congress to establish priorities among the many competing demands on the Agency's resources and shield Agency actions from political pressures which may be brought to bear on the regulatory agenda. Furthermore, the deadlines allow citizens to participate in "oversight" of the process by providing cause for a citizen suit to compel action when there has been a failure to perform a non-discretionary duty.

In this instance, however, a different methodology has been chosen to assure that an adequate and timely regulatory response is made to a problem which has been identified as a high priority. The Board is designed as an independent agency with special expertise in the investigation and prevention of chemical accidents. Its recommendations require a formal response from the Administrator, and although the Administrator may decline to issue a recommended requirement for good cause, it is expected that in most instances the Board's recommendations will be implemented in a timely way. In an area of great complexity such as is addressed here, the Committee intends that this institutional mechanism will overcome the regulatory inertia which so frequently plagues an Agency with too many assignments and too few resources, and does so without the inflexibility associated with detailed statutory prescriptions, deadlines and hammers.

The interim report by the Environmental Protection Agency entitled *Review of Emergency Systems* which was required by section 305(b) of the Emergency Planning and Community Right-to-Know Act of 1986 and was published in May of 1987 mentions four categories of technologies or techniques that give preliminary definition to the prevention authority provided here:

> (1) *Hazard evaluation,* that is, quantitative and qualitative techniques for determining what series of events could result in an accidental release;
>
> (2) *Pre-release prevention,* that is, intrinsic and extrinsic systems to reduce the probability that the primary containment of a chemical in a process line will be breached (often called "loss of containment");
>
> (3) *Pre-release protection,* that is, control techniques such as flares, scrubbers, or holding ponds to contain, de-

stroy or reduce the quantity of the substance before it is subject to release; and

(4) *Post-release mitigation*, that is, measures that can be taken after a release to the environment has occurred to limit the spread of the released chemical and minimize damage to public health and the environment.

Hazard evaluation is discussed above in the context of hazard assessments which are required for all facilities producing, processing, handling or storing extremely hazardous substances listed pursuant to subsection (c) in more than threshold amounts.

Pre-release *prevention* systems are intended to assure that primary containment of a chemical process will not be breached. Prerelease systems include those designed into a process (called "intrinsic systems" by EPA) to control the flow, pressure, temperature and concentration of a process. They may specify fabrication and other design standards for equipment including pipes, vessels, valves, etc. They may also include redundancy and back-up systems. Prevention systems may also be required outside of the process (called "extrinsic systems" by EPA) and as a retrofit to existing systems and may include modifications to equipment or process parameters (inclduing substitution of less hazardous substances). Of course, management and operating procedures play an important role in preventing accidental releases through operator training, the development of emergency procedures and maintenance and safety reviews.

Pre-release *protection* systems are intended to contain, destroy or reduce the quantity of extremely hazardous substances before they move off-site. Pre-release protection technologies include flares, scrubbers, absorbers, double walled construction of process and storage vessels and other types of secondary containment. They are designed to destroy the hazardous substance through combustion or chemical neutralization or contain the substance until remedial action can be taken. Back-up systems of this type offer important safeguards for some accidental releases, but as the events in Bhopal demonstrated, can be overwhelmed by large releases. In response to the Bhopal tragedy, effective prevention for methyl isocyanate releases has been provided at one site by modifications in the production process which have greatly reduced the quantity of the chemical held at any point during the series of reactions leading to the final product. Similarly, prevention technologies are to be generally preferred to protection technologies where prevention eliminates the possibility of a serious event.

Post-release *mitigation* measures are used after loss of containment has occurred to reduce the hazard before the substance moves off-site. They include dikes and berms and methods to cover free liquids and the use of foam and other agents to prevent fire, explosion, or volatilization of free liquids.

The interim report required by section 305(b) of title III of SARA (the Emergency Planning and Community Right-to-Know Act of 1986) emphasized technologies to be used in accident prevention and mitigation. It also described the process EPA would use in surveying the chemical industry to determine the availability and effectiveness of such technologies. EPA's final report on this survey effort, (also entitled) *Review of Emergency Systems,* issued in June of 1988 indicated that technological "fixes" to prevent chemical accidents such as those described above may not be widely available. Rather, the problem of accidental releases must be addressed in facility-specific, management programs which integrate measures in a number of areas (documentation, training, maintenance, investigations and audits, as well as, technological systems for release prevention).

> Overall, the section 305(b) review indicated that there is no single method or technology that works best in every situation. In each area considered in this review, the determination of what constitutes a "state-of-the-art" technology for a particualr facility depends on the individual circumstances of the facility—its location and layout, its process, the chemicals handled, and the hazards associated with the specific chemicals and processes . . . .

Recognizing the elements of truth in this statement, it is still possible to identify generic management measures or technology standards which can be employed to reduce the likelihood of chemical accidents and mitigate the effects should they occur. A review of the literature and State programs to prevent accidents has indicated that each of the following eleven program elements may be appropriate in accident prevention efforts and should be considered by the Administrator when establishing requirements for facilities handling extremely hazardous substances under the authority of this section.

Hazard Evaluation.—This element was discussed at length above as hazard assessments are to be prepared by every facility handling extremely hazardous substances listed under subsection (c) in more than threshold amounts. In the final report entitled *Review of Emergency Systems* EPA concluded:

> The facility questionnaire responses indicate that ongoing efforts to inform chemical facilities about hazard evaluation techniques need to be expanded. Although almost all of the respondents stated that they use hazard evaluation methods, only half are using the AIChE-recognized techniques. The other facilities listed less formal techniques or techniques not generally considered to be hazard evaluations.

Maintain process safety documentation.—Each facility should maintain information including basis diagrams on process design, documentation on maximum and minimum operating parameters and information (physical, chemical and toxicity data) on materials used as feedstocks or produced in the process. The documentation should be available to personnel with control over day-to-day operation and should be updated whenever fundamental aspects (including, but not limited to, feedstocks, catalysts, operating conditions, equipment, product specifications, by-products and waste products, or inventories) of the process change.

Regular Safety Review of New and Existing Equipment.—This program element is to include formal management procedures to review any changes made in the facility or the process. New equipment should be evaluated against industry codes and standards and critical equipment should be "state-of-the-art" for the particular application. In this regard, EPA's *Review of Emergency Systems* includes the following caution:

> . . . a number of widely accepted codes, standards and recommendations provide minimum safety standards for equipment design, procedures and systems. It should be stressed that these standards and codes are minimums . . . for the most part, meeting the minimum safety requirements is not sufficient for facilities handling extremely hazardous substances.

There are, however, codes for use with respect to specific extremely hazardous substances, for instance *Safety Requirements for the Storage and Handling of Anhydrous Ammonia* developed by the American National Standards Institute, which can serve as a reliable guide to process safety for extremely hazardous substances in some cases.

The State of New Jersey, as part of its Toxic Catastrophe Prevention Act program, requires that newly installed, critical equipment (equipment which is part of a system to contain the release of an extremely hazardous substance) be "state-of-the-art".

New Jersey also suggests that existing equipment be reviewed annually to assure that it continues to be operated as was intended in the original facility design and that any discrepancies (between design and operating parameters) be corrected.

The safety review element of an accident prevention program should also include quality assurance provisions to check on the fabrication, construction and installation of new equipment before it is put into service.

Operating procedures.—A fourth element in a management program to prevent accidental releases is written operating procedures for the process or facility covering startup, shutdown and emergency response in addition to normal operating conditions. These written procedures should include clear instructions for operator response to deviations from normal process parameters. Operating procedures may also include safety measures and managment items such as control of access to the facility and reporting and record-keeping responsibilities.

Operator training.—Operator training is an important element of every accident prevention program. EPA's ARIP data base indicates that 31 percent of the serious events which it investigated were caused by operator errors.

Operator training may include orientation sessions, intensive process and safety training, training in handling extremely hazardous substances, refresher courses and mandatory pass/fail tests for operator certification.

Preventive maintenance.—EPA's ARIP data base also indicates that a program of preventive maintenance is essential to accident prevention. The ARIP update published in July of 1989 indicated that:

> Equipment failure was the primary cause of approximately 56 percent of the ARIP surveyed releases. This large percentage was not surprising because many factors

> contribute to equipment failures: lack of preventive maintenance, lack of equipment inspections, improper operation of equipment, poor equipment design, and age . . . Only 4 percent [of those experiencing a reportable release] indicated that they performed preventive maintenance on the failed equipment or system [prior to the event].

Among the measures suggested in the literature or mandated in State programs are: inspection, testing and repair of critical equipment according to a written schedule; following industry codes or design specifications for maintenance; training maintenance personnel; documenting maintenance as it is completed; and replacing critical equipment before the end of its useful life.

Equipment for which preventive maintenance programs are essential include pressure vessels and storage tanks; critical piping; relief and vent systems and devices; emergency shutdown systems; and critical controls, alarms and interlocks.

Release prevention measures.—Various release prevention systems were described above in the review of EPA's interim report under section 305(b) of SARA. They include, but are not limited to:

(1) backup, redundant and interlock systems in the process design;

(2) the substitution of less hazardous materials;

(3) reduction in process severity (temperature and pressure) or complexity;

(4) smaller volumes of extremely hazardous substances in storage;

(5) process monitors to detect deviations from normal operating parameters;

(6) protection systems like scrubbers and flares; and

(7) post-release mitigation measures including water curtains, liquid containment and cover systems and measures to prevent fire and explosion.

Release detection systems.—These devices and methods will be discussed more thoroughly in the context of subsection (g) requirements below and were reviewed in detail in the EPA report *Review of Emergency Systems* prepared pursuant to section 305(b) of SARA. It is important to point out that leak detection is not as effective in reducing the threat of chemical accidents as are the prevention systems and measures described above. Leak detection can, in some instances, alert system operators to the presence of small amounts of extremely hazardous substances before a process upset becomes a run-away catastrophe. However, for events that develop quickly, corrective action and emergency response measures may not be implemented in time to prevent serious damage, injury or deaths. Unlike programs to control the slow release of harmful materials (for instance, the underground storage tank program) detection is not a satisfactory substitute for prevention in the case of large spills and vapor releases of extremely hazardous substances.

Upset and accident release investigations.—Facility owners and operators should conduct a timely (commencing within 48 hours) investigation of each upset or accidental release which has the potential for causing substantial harm or being the precursor of such an event. The investigations should be documented in written reports including recommendations for equipment or operational changes. The investigations should be conducted by knowledgeable persons with access to process information and the results should be communicated to process operators when the investigation is completed.

Alert systems and emergency response plans.—Techniques to alert the public in the event of an accidental release and to implement emergency response plans have been reviewed as the result of the Emergency Planning and Community Right-to-Know Act of 1986. The requirements of that legislation are described in the introductory material to this title and technologies for alert systems are reviewed in EPA's Section 305(b) Report. The important elements are: 1) written operating procedures containing the necessary information to notify emergency response personnel at the facility and in the community; 2) advance information available to community emergency response officials to facilitate implementation of their plans; 3) exercises in the implementation of the plan; and 4) regular testing of notification equipment and the maintenance of backup systems in the event that the primary system is damaged by the accidental release.

Program audits.—Each of the elements of the accident prevention program outlined above should be audited on an annual basis by company personnel (other than those directly responsible for the process unit) or outside consultants with access to process information at the facility to assure that each element is up-to-date and to identify corrective measures that are needed.

These eleven elements have been described to indicate the range of authorities which are available to the Administrator under subsection (f). It is not intended that the Administrator be limited to these authorities or that each element be required in every case or immediately. They do reflect recommended elements for accident programs identified by several expert or regulatory sources.

Subsection (f) of the new section 129 would also authorize the Administrator to require that the owner or operator of any facility handling an extremely hazardous substance prepare a risk management plan. This provision is modeled on the New Jersey Toxic Catastrophe Prevention Act which requires the preparation of such a plan for each facility in New Jersey handling any one of the extremely hazardous substances which the State has listed. The New Jersey plans are required to include eight of the elements which were described above (safety reviews of new and existing equipment; standard operating procedures; preventive maintenance; operator training; accident investigation; hazard evaluation; emergency response planning; and annual audits). In the New Jersey program, these plans are submitted to a State agency for review and may be returned to the owner or operator for corrective action.

Under the proposed legislation, the Administrator may require that such plans be reviewed by an independent engineer (knowledgeable in these fields) who is not otherwise employed by the facility owner or operator. The independent engineer must certify on the plan or return it to the owner or operator with recommended changes. Corrective actions recommended by the independent engineer must be implemented by the facility owner or operator. A similar review provision has been included in the SPCC program under section 311 of the Clean Water Act.

The risk management planning requirement may be different from other requirements imposed under this subsection in that it requires a comprehensive plan covering the whole facility (rather than any specific piece of equipment, substance or process) and is reviewed independently with corrective action mandated.

The Administrator is to coordinate actions under this authority with actions taken by the Occupational Safety and Health Administration so that requirements imposed by both agencies to accomplish the same purpose are not unduly burdensome or duplicative. This requirement for coordination in no way diminishes the Administrator's authority to act and does not imply that requirements under this section must be set aside or delayed where OSHA is acting with respect to the same hazard. Quite often protection technologies which are appropriate for workers on-site (protection clothing, respirators, etc.) and which may be required by OSHA would not be effective to prevent death or injury among the general public residing or working near a facility.

It is not a purpose of this subsection to impose additional penalties on the owners or operators of facilities where a single event violates requirements imposed both under this section and by OSHA. In response to those events a single enforcement strategy should be developed through consultation between the two agencies.

Testimony at hearings before the Committee by representatives of the chemical manufacturing industry indicated a belief that OSHA may be a more appropriate lead agency than EPA to implement some of the authorities granted in the proposed section 129. Accidental releases with the potential to cause injury and death outside the boundaries of a facility handling extremely hazardous substances would typically present an equal or greater threat to the health and safety of workers working at the facility during the event. OSHA is charged with assuring that the health and safety of workers is protected from the adverse effects of such events. And OSHA already has authority to implement requirements similar to those described here.

But it must be noted that OSHA has not chosen to act on those authorities even in light of the evidence from its own post-Bhopal study (the Chemical Special Emphasis Program) which indicated that existing OSHA regulations are not effective in preventing or mitigating the threat of catastrophic chemical accidents.

A private consulting organization has circulated a proposed accident prevention program which is prepared for consideration and promulgation by OSHA (see Organization Resource Counselors, Inc. (ORC) "Memorandum of the Vice President dated December 9, 1988"). Although there is much to commend in this proposal, it would not, if promulgated as written, satisfy the intent of this legislation with respect to accident prevention. It proposes to preempt all State and local government action in this area. The bill, by contrast, contemplates a cooperative Federal-State program employing the strengths of each governmental level to prevent accidents. The ORC proposal, by definition, declares all hazards evaluation material to be confidential and subject to trade secret protection and is, thus, contrary to the purpose of the hazard assessment requirement imposed here (and to the provisons of current law which authorize local emergency planning commissions to request such information from facility operators). Finally, the proposed rule would impose only vague performance standards on facility owners and operators which would be essentially unenforceable with respect to any specific element in the recommended program.

In respect to the balance of responsibility between EPA and OSHA in this area, it must also be noted that EPA has been assigned significant responsibilities in emergency planning and the coordination of reporting and record-keeping requirements for releases of extremely hazardous substances under CERCLA and SARA. As the result of these authorities, EPA has developed considerable expertise in the area of accident prevention. For instance, the substances proposed to be listed under the ORC document cited above are drawn from the list of substances promulgated by EPA under section 302(a) of SARA.

The current language of section 112 of the Clean Air Act may be read to authorize a program to prevent the release of extremely hazardous substances to the air. Section 112 contains no language limiting the regulatory authority to the establishment of standards for routine, process releases only. Section 112(a)(1) of the Clean Air Act defines a hazardous air pollutant as an air pollutant which may reasonably be anticipated to result in "an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness." On its face, this definition applies equally to an acutely dangerous pollutant which can cause death or serious illness due to an accidental release and to a chronically dangerous pollutant which can cause death or serious illness after prolonged routine emissions. Thus, the bill does not create entirely novel authorities for EPA; nor does it move the Agency into a field fully and effectively occupied by OSHA standards.

Subsection (f) does not authorize the Administrator to promulgate requirements which would be applicable to the accidental release of radionuclides from a facility which is licensed by the Nuclear Regulatory Commission.

No specific compliance deadline is established under this subsection for the accident prevention requirements which may be imposed by the Administrator. The Administrator is to establish an effective date for each regulation at the time it is promulgated. The effective date may be different for new and existing facilities and requirements for new facilities may be applicable to facilities which begin construction at any time after the requirement is first proposed. Generally, requirements which only mandate changes in procedure can be implemented by new and existing facilities almost immediately. However, other changes which involve capital investment or the development of specialized programs may requre more time to implement at existing facilities. As noted above, the Board may include in its recommendations for proposed rules compliance schedules taking into consideration these factors.

Accident prevention requirements promulgated pursuant to subsection (f) may be enforced by the Administrator under section 113 of the Clean Air Act.

Detection.—Subsection (g) of the proposed section 129 requires that regulations promulgated under subsection (f) include leak detection requirements for any facility handling an extremely hazardous substance (in more than threshold amounts) which has been listed under subsection (c). The regulations must provide for the monitoring of all devices and systems, storage facilities and transfer points at which listed substances are present. Furthermore, such monitoring systems must be continuous in nature, that is, they must have the capability to provide immediate detection and notification to the facility operator that an accidental release of a covered substance is occurring.

Continuous monitoring technology is available to provide an early warning of unplanned releases before they threaten catastrophic results. Such technologies have been installed voluntarily by a number of domestic and foreign semiconductor firms. These systems permit the monitoring of as many as 25 different gases at as many as 50 different points in the facility, with analysis of samples from each location during each thirty minute interval. Low level alarms as well as high level alerts can be triggered when an accidental release occurs, to notify the plant operator of the occurrence so that it can be corrected as soon as possible.

Requirements under this subsection may permit the use of a variety of continuous monitoring systems. This will depend on the specific circumstances of the each covered facility, including its size and type, as well as the quantity and characteristics of the hazardous substances present. The advantages and disadvantages of various detection systems are discussed in the EPA report, *Review of Emergency Systems,* published in June of 1988. EPA noted in the report that additional research and development needs to be conducted to improve the performance and lower the cost of some system designs before they can be widely useful in accident prevention programs. The Administrator should actively support such research with the research and development authorities granted under this section.

Order authority.—Subsection (h) of the new section 129 authorizes the Administrator to secure action through district courts which will abate any threat of imminent and substantial endangerment of public health, welfare or the environment due to the release or potential release of an extremely hazardous substance. The Administrator may also issue orders (including requirements for modifications in equipment, processes, training and procedures) and take other actions which may be necessary to protect human health, welfare or the environment. Persons failing to comply with an order may be subject to a fine of up to $25,000 per day for each day of non-compliance.

These authorities are not unlike the powers granted to the Administrator under other statutes including section 303 of the Clean Air Act and section 106 of CERCLA. The Administrator is directed to publish guidance for the use of subsection (h) in concert with these other authorities.

The provisions of this subsection are very similar to those of section 106 of the Comprehensive Environmental Response, Compensation and Liability Act which have been reviewed by the courts on several occasions. See especially *B.F. Goodrich* v. *Murtha,* 697 F.

Supp. 89; *United States* v. *Conservation Chemical Co.,* 619 F. Supp. 162; *United States* v. *Ottati and Goss,* 630 F. Supp. 1361; and *United States* v. *Northeastern Pharmaceutical and Chemical Company,* F. Supp. 832.

The *Conservation Chemical* case includes the most extensive discussion of these provisions and will be quoted here at length to establish the intent of the legislation with respect to this subsection.

First, "the United States does not have to prove that 'an imminent and substantial endangerment' actually exists. The statute clearly authorizes the United States to obtain relief when 'there *may* be an imminent and substantial endangerment' ". *United States* v. *Conservation Chemical Co.,* 619 F. Supp. at 192.

Second, "the United States does not have to show that *people* may be endangered . . . [the statute] authorizes relief where there may be endangerment to the 'public health *or* welfare *or* the environment.' Use of the disjunctive 'or' mandates the conclusion that possible endangerment to the public welfare alone, or a possible endangerment to the environment alone, will warrant relief." Furthermore, "the term 'public welfare' is exceptionally broad, and encompasses 'health and safety, recreational, aesthetic, environmental and economic interests.' *City of El Paso* v. *Reynolds,* 597 F. Supp. 694." *United States* v. *Conservation Chemical Co.,* 619 F. Supp. at 192.

Third, as to the nature of the endangerment which may give rise to action under this subsection, the Court said (of the comparable use of the term in CERCLA) that "an endangerment need not be an emergency in order for it to be 'imminent and substantial' ". *United States* v. *Conservation Chemical Co.,* 619 F.Supp. at 192. "[T]he United States need not qualify the risk of harm in order to establish an endangerment. Both the courts and Congress have recognized that the evaluation of a risk of harm involves medical and scientific conclusions that 'clearly lie on the frontiers of scientific knowledge,' such that 'proof with certainty is impossible.' ". Further, "an endangerment need not be an emergency in order for it to be 'imminent and substantial' ". *United States* v. *Conservation Chemical Co.,* 619 F. Supp. at 193.

In the application of the general standard both in the context of court action and when issuing orders, the Court recognized (by citing the legislative history of the Safe Drinking Water Act) that Congress intended for the Administrator to act in favor of protecting health, welfare and the environment rather than to interpret the authority of the statute narrowly. "Congress' emphasis on the protection of health and the environment, and especially its approval of the use of nondefinitive data in risk assessment, means that if an error is to be made in applying the endangerment standard, the error must be made in favor of protecting public health, welfare and the environment. Thus, just as the word 'imminent' does not require proof that harm will occur tomorrow, and the word 'endangerment' does not require quantitative proof of actual harm, the word 'substantial' does not require quantification of the endangerment . . . Instead the decisional precedent demonstrates that an endangerment is substantial if there is reasonable cause for concern that someone or something may be exposed to a risk of harm by a release or a threatened release of a hazardous substance if remedial action is not taken, keeping in mind that protection of the public health, welfare and the environment is of primary importance." *United States* v. *Conservation Chemical Co.*, 619 F. Supp. at 194.

Finally, it is important to note in this context that harm or threatened harm may be present even when only very small amounts of an extremely hazardous substance may be released. Although the Administrator may establish threshold amounts of substances which are listed under subsection (c) for the purpose of indicating which facilities handling these substances must conduct hazard assessments pursuant to subsection (d), the presence of substances in amounts greater than such threshold amounts shall not be a necessary condition for taking action under this subsection. A substantial endangerment may occur in the presence of lesser amounts.

The Administrator may seek injunctive or other relief from a court or issue an administrative order when extremely hazardous substances whether or not they are listed under subsection (c) may be presenting a threat or when listed substances in quantities less than threshold amounts may present a threat. This is especially important in light of the evidence from the Acute Hazardous Events Data Base cited above which indicates that 37 percent of the injury events recorded in that data base involved the release of substances in amounts less than the reportable quantity under CERCLA. Therefore, threshold quantities listed here may be different from reportable quantities under CERCLA.

It is not intended that the Administrator use the order authority available under this paragraph to conduct a plant-by-plant safety review of the chemical industry as is provided in the New Jersey Toxic Catastrophic Prevention Act. Although such an approach may be effective when implemented by an agency with significant expertise, the development of facility-specific risk reduction work plans is currently beyond the capability of the Environmental Protection Agency. EPA may conduct audits and investigations as part of an enforcement scheme for requirements promulgated under subsection (f), but it is not intended that a top-to-bottom investigation of every site handling an extremely hazardous substance will be conducted on a routine schedule. Such audits are the responsibility of the owners and operators of these facilities.

However, when a facility experiences an accidental release which causes death, serious injury or substantial property damage, it, *prima facie*, presents a threat of imminent and substantial endangerment to public health. In other industries (as with pipeline operations under the Hazardous Liquid Pipeline Safety Act) facilities experiencing such accidents are only allowed to go back into operation pursuant to an order (like that which may be issued under subsection (h)) which assures that conditions contributing to the accidental release have been corrected. The authorities of subsection (h) can be implemented to include a prohibition on restarting a facility where an accident has occurred until corrective action pursuant to an order to remove the imminent endangerment has been taken.

Enforcement.—Subsection (i) of the new section 129 includes a cross reference to other sections of the Act to provide for enforcement (section 113), information gathering (section 114), judicial review (section 307) and citizen suits (section 304) with respect to any standard or requirement promulgated under section 129 in the same manner as any standard or requirement that is promulgated under section 112 would be treated under such sections.

Presidential review.—Subsection (j) of the new section 129 requires the President to conduct a review of the accident prevention, mitigation and response authorities of the Federal Government to determine whether reorganization would facilitate more effective administration and implementation of such authorities. The review would include programs at the Environmental Protection Agency, the Department of Labor, the Department of Transportation, the Nuclear Regulatory Commission, the Federal Emergency Management Administration, and other agencies and departments. As many as 14 different departments and agencies have participated in the work of the National Response Teams which have been organized in the aftermath of chemical and petroleum accidents.

The President may utilize the Chemical Safety Board authorized by subsection (e) as the agency to conduct the review required by this subsection. Employing the Board for such a purpose would facilitate an early integration of the Board's functions with those of other Federal agencies and may provide a continuing point of contact and coordination for this purpose after the initial review is complete. Testimony from the chemical industry to the Committee in hearings indicated support by the regulated community for a coordinated Federal approach to accident prevention and suggested that an agency like the Board might most effectively carry out that responsibility.

The President is to transmit a message on Federal authorities for release prevention, mitigation and response to the Congress not later than 24 months after the enactment of this legislation containing a report on the report on the review which has been conducted and including any recommendations for legislative change in authorities which the President deems appropriate including the development of new authorities to assure a effective and efficient Federal response to catastrophic chemical accidents.

Nothing in this section would authorize the President to reassign responsibilities for accident prevention or mitigation delegated to a specific agency by statute.

State authority.—The new section 129 of the Clean Air Act is intended to create a comprehensive Federal scheme for the prevention of accidental releases of extremely hazardous substances. Under the provisions of section 112 (as amended by S. 1630), States may participate in this regulatory program. On other occasions when similar schemes have been enacted, Federal courts have concluded that the Federal law is preemptive of some State and local authorities even when the preemption was not explicitly stated or intended. To assure that such a preemption of State or local law, whether statutory or common, does not occur, environmental legislation enacted by the Congress has consistently evidenced great care to preserve State and local authority and the consequent remedies available to citizens injured by the release of harmful substances into the environment.

Although the Clean Air Act already contains provisions (section 116) explicitly preserving the authorities of State and local governments, the language of current law is not entirely unambiguous with respect to the provisions included in the new section 129, since section 116 refers to emissions standards or the abatement or control of air pollution. To assure that a court would not find the accident prevention authorities established here outside the boundaries of the powers specifically enumerated in section 116, subsection (k) of the new section 129 preserves in the broadest way the authority of State and local governments to regulate in the same area as would be covered by section 129, except that State or local governments may not promulgate standards applicable to an extremely hazardous substance or facility which are less stringent than requirements promulgated by an agency of the Federal Government pursuant to this section.

Authorization.—Subsection (1) of the new section 129 authorizes the appropriation of such sums as are necessary to carry out the activities delegated to the Administrator by this section.

Cost to Regulated Entities.—EPA conducted a study to determine the regulatory costs of the air toxics provisions of title III of S. 1630, title III of the Administration bill (S. 1490) and the provisions of H.R. 2585 introduced by Congressman Leland.

EPA concluded that the accident prevention provisions of the bill contained in the proposed section 129 would have a one-time (not annual, but total) cost between $903 million and $1.806 billion. These costs are principally attributable to the hazard assessment requirement which was estimated to cost $20,000 to $40,000 per chemical with each facility conducting assessments for four chemicals on the average.

By way of comparison, the accident prevention requirements of H.R. 2585 were projected to cost $100,000 to $250,000 per facility for a total of $1.129 to $2.822 billion. The EPA study noted that the accident prevention provisions of the Administration bill have a scope similar to the program included in S. 1630 and thus the costs of S. 1490 may range upward to the same level as the provisions reported here.

In respect to these cost projections, the EPA study noted that these estimates may be at the high end of the range:

> It is important to note that the per-facility costs used to estimate the compliance costs for these bills are most likely an upper bound on the costs of preparing such assessments. Currently existing accidental release practices, economies of scale not represented in the estimates, and the potential of "generic" assessment techniques may result in lower costs. It is also important to note that numerous provisions in both the Administration bill and [S. 1630] are required "as appropriate." To the degree that these measures are already being met by industry, facility cost estimates could be much lower.

MUNICIPAL WASTE COMBUSTION: AIR EMISSIONS (SECTION 306)

SUMMARY

A new section 130 is added to the Clean Air to direct the Administrator to set performance standards to control the emissions for new and existing municipal solid waste incineration units. The performance standards shall specify emission limits reflecting the greatest degree of emissions limitation achievable through application of best available control technologies and practices, and shall be effective for new units no later than 18 months after enactment. The Administrator shall also set performance standards specifying emission limits for existing facilities, and a timetable for bringing existing units into compliance with those standards no later than 6 years after enactment.

Available control technologies and practices include electrostatic precipitators, fabric filtration, flue gas scrubbers, spray dry scrubbers, condensation scrubbers, negative air flow, and good combustion practices, including use of auxiliary fuel to maintain specific temperatures. In setting performance standards the Administrator may take into account the use of other technologies and practices, such as selective or non-selective catalytic reduction, wet flue gas denitrification, selective non-catalytic reduction, wet scrubbing, or catalytic oxidation.

In establishing performance standards, the Administrator shall specify emission limits for particulate matter, acid gases, sulfur dioxide, oxides of nitrogen, carbon monoxide, heavy metals, lead, cadmium, halogenated organic compounds, dioxins, and dibenzofurans, and shall use numerical limits or other methods to reduce the emissions of volatile organic compounds, mercury, beryllium, hydrogen floride, hydrogen chloride, antimony, arsenic, barium, chromium, cobalt, copper, nickel, selenium, zinc, polychlorinated biphenyls, chlorobenzenes, chlorophenols, and polynuclear aromatic hydrocarbons. The legislation establishes maximum emissions limits which the standards may not exceed for particulates, carbon monoxide, hydrogen chloride, and sulfur dioxide. The standards must establish combustion parameters including a retention temperature and time of not less than 1,800 degrees Farenheit for 1 second at fully mixed height, or the equivalent.

Beginning 24 months after the date of enactment, a municipal waste incineration unit cannot be permitted unless an ash management plan has been submitted; construction on such unit shall not begin until enforceable treatment or disposal is submitted. Permits issued under this section shall be for a term of 20 years and are to be reviewed every 5 years.

Beginning 36 months after enactment, a municipal waste incineration facility shall not be permitted unless the jurisdictions served have adopted programs which are certified by the state to achieve a 25 percent solid waste recycling rate unless that recycling rate is economically unfeasible and an alternative rate is established in such jurisdictions before the incinerator begins operation.

The Administrator shall promulgate, within eighteen months after enactment, regulations requiring continuous monitoring for opacity, hydrogen chloride, sulfur dioxide, oxides of nitrogen, carbon monoxide, carbon dioxide, oxygen, stack temperature and furnace temperature, and other emissions the Administrator determines should be monitored continuously. All other emissions for which standards are set shall be monitored periodically. The Administrator or the State is authorized to request the Administrator of the Agency for Toxic Substances and Disease Registry to conduct a health assessment or health surveillance in any case where exposure to municipal incinerator emissions or ash may pose a potential risk to human health.

Notwithstanding any other provision of the Act, each permit for a municipal solid waste incineration unit shall have a term of 20 years and shall be reviewed every five years. The Administrator of a State may review and modify a permit at any time during its term. No permit may be issued by any agency, instrumentality or person that has any responsibility for the design, construction or operation of the permitted municipal incineration unit.

Nothing in this section shall diminish the Administrator's authority to promulgate more stringent standards under section 111 or 112 of the Act, nor diminish authority to regulate pollutants not specified in subsection (a), nor diminish other authorities, including the authority to establish national ambient air quality standards for such pollutants. No requirement of an applicable implementation plan under section 165 or section 172(b)(6) may be used to weaken standards in effect under this section.

Any State may submit a proposed State program for concurrent enforcement to the Administrator. If the Administrator has not determined within 90 days after submision that the State plan does not provide enforcement equivalent to Federal enforcement, the State plan shall be treated as authorized. The Administrator shall withdraw authorization for such State plan whenever the Administrator determines that the State is not enforcing in a manner equivalent to Federal enforcement.

Any State or its political subdivision may adopt and enforce standards, requirements or regulations more stringent than those in effect under this section.

For the purposes of sections 111(e), 113, 114, 116, 120, 304 and 307, the standards and requirements promulgated under this section shall be treated as emission limitations or performance standards under section 111, and each requirement of an authorized State plan shall be treated as a requirement of an applicable implementation plan.

A "municipal waste incineration unit" is defined as a distinct operating unit at any facility at which solid waste from commercial, industrial or the general public (including single and multiple residence, hotels and motels) is combusted, but does not include facilities required to be permitted under section 3005 of the Solid Waste Disposal Act. The Administrator may promulgate separate standards for incinerators of hospital wastes.

A municipal waste incinerator unit is "new" under this section if it is not operational on or before January 1, 1988, and construction is not substantially completed. Facilities are considered substantially completed if the cost of the required pollution control equipment will be more than twice what it would have cost to include the equipment as part of the permitted design. Effective January 1, 1992, units which have been in operation 30 years or more will be considered "new" units under this section.

A municipal waste incineration unit is considered to be a "modified" unit if modifications have occurred after the date of a standard under subsection (a) where the cumulative cost of the modification (over the life of the unit) exceed 50 percent of the original cost of construction and installation.

An "existing" municipal waste incineration unit is one which is not a new unit.

Not later than 18 months after enactment, the Administrator shall publish guidelines identifying items or materials that should not be incinerated, but should be removed from the waste stream prior to incineration through source separation or limitations on the composition of products or on the disposal of such items or materials in municipal waste.

The Administrator shall develop a model State program for training and certifying municipal waste incinerator personnel. States may implement the EPA model program, or EPA may authorize a State to implement its own program if it is at least as stringent as EPA's model. All municipal incincerator operators and management personnel must be certified through such a program.

DISCUSSION

On July 1, 1987 EPA provided Congress with a report, required by section 102 of the Hazardous and Solid Waste Amendments of 1984, on the health risks posed by emissions of polychlorinated dibenzo-p-dioxins from municipal solid waste incinerators. EPA's health risk analysis concentrated on the estimated risk of cancer through direct inhalation of incinerator emissions. The analysis did not quantitatively assess health risks other than carcinogenic risks from dioxin, and failed to quantify risks associated with other avenues of exposure to this carcinogenic risk, such as ingestion of food and water polluted as a result of incinerator emissions. Nevertheless, EPA's study estimated that the annual incidence of cancer aggregated over the United States is 3 to 38 cases per year for existing municipal waste incinerators, and 2 to 22 cases per year for those incinerators projected to be built. The maximum individual risk (for individuals with the greatest potential exposure to incinerator emissions) ranges from 1 in 1,000 to 1 in 10,000 for existing facilities, and from 1 in 10,000 to 1 in 100,000 for projected facilities. Many in the environmental community believe these risks are underestimated. The report concludes that there is cause for concern over health risks from exposure to dioxin and furan emissions of municipal waste incinerators.

In addition to the dioxins and other compounds (cadmium, beryllium, and arsenic) quantified in the cancer risk assessment, EPA's report analyzed emissions of other pollutants of interest, including lead, mercury chromium, nickel, and other metals; sulfur dioxide, hydrogen chloride and other acid gases; carbon monoxide; nitrogen oxides; and classes of unspecified organics. It was found that application of a control technology for one pollutant may affect control of other pollutants, and surrogate relationships among pollutants were discovered. For example, since complete combustion affects emissions of dioxins and other organics and also affects the production of carbon dioxide rather than carbon monoxide, a low carbon monoxide emission rate can be used as a surrogate measure of complete combustion and as an indicator of dioxin emissions.

The reported bill requires EPA to promulgate standards of performance for air emissions from municipal incinerators based on the best available technology and practices. The principal concern with incinerator emissions is the control of organics (particularly dioxins) and heavy metals to minimize their adverse health affects. Regulations should seek to minimize exposure of potential receptors.

Siting requirements can add an additional degree of protection for human health or the environment.

The reported bill requires the Administrator to set performance standards which specify emissions limits for a list of pollutants. This provision also specifies maximum emissions limits for particulates, carbon monoxide, sulfur dioxide, and hydrogen chloride. These pollutants are important in their own right or as surrogates for other pollutants. Particulates like ash and dust cause soot and visibility problems as well as health problems, but can also carry metals and organic compounds which are not completely combusted. Electrostatic precipitators (ESP) and baghouses which control particulate emissions also control emissions of metals, such as lead, and organics, such as dioxins. Emissions of hydrogen chloride, which can do considerable damage to structures and other materials, are extremely variable depending on the amount of plastics and paper with bleaching agents in the waste stream. The scrubbers which control acid gases also control emissions of dioxins and other organics. Carbon monoxide, although a criteria pollutant, results from incomplete combustion, and as such, is a surrogate for dioxin emissions. Practices which maximize combustion efficiency help control the emissions of both carbon monoxide and organics. The legislation requires furnace temperatures of 1800 degrees Farenheit for at least one second at fully mixed height (or its equivalent) as one means of maximizing combustion and controlling organics and carbon monoxide emissions.

While the exact nature of good combustion practices, technologies and devices may vary among the types of municipal waste incinerators (massburn, refuse derived fuel or RDF, and modular units), municipal incineration units of all types are required to meet the statutory emission standards for particulates, carbon monoxide, sulfur dioxide, hydrogen chloride, and furnace temperature set forth in the legislation. Some facilities may require the use of auxiliary fuels at times, such as start-up and shutdown or when wet wastes are being combusted, in order to maintain the required furnace temperature to assure complete combustion.

In addition to the control technologies specified as available, the Administrator is authorized to consider other technologies, such as selective catalytic reduction, for the purpose of establishing performance standards.

Pollutants which are trapped by control devices before entering the air become incinerator fly ash. Managing incinerator ash, therefore, is inextricably linked to controlling air emissions from municipal waste incinerators. Upon enactment of this legislation, new municipal incineration units cannot be permitted unless a plan is submitted detailing how the incinerator ash will be managed and disposed. The plan should include the methods to be employed to minimize or eliminate fugitive emissions in the handling and transportation of fly and bottom ash. No construction can begin on a new incineration unit until there is a reasonable demonstration of adequate capacity for treatment and disposal sufficient to handle the amount of ash to be generated by the facility.

Language throughout section 4003 of the Solid Waste Disposal Act refers to comparisons between conservation of materials and recovery of energy. This balance of factors should be kept in mind as incinerators are permitted so that any long-term commitments of waste to be supplied to the incinerator to guarantee adequate Btu input reflect and do not impede long-term programs for the recovery of materials through recycling and other conservation efforts. To the extent possible and Btu commitments made to incinerator owners or operators should also reflect the guidelines which the Administrator is required to promulgate within eighteen months of enactment identifying items or materials which should not be incinerated.

The Administrator is directed to promulgate within eighteen months after enactment regulations requiring monitoring and reporting of emissions from new, modified and existing incinerators. Monitoring shall be required at the point where emissions enter the ambient air and at other points as necessary to protect human health and the environment. Continuous monitoring is required for opacity, hydrogen chloride (if an appropriate monitoring device or method is available), sulfur dioxide, oxides of nitrogen, carbon monoxide, carbon dioxide, oxygen, stack temperature, furnace temperature (or secondary combustion zone temperature as appropriate) and any other emissions the Administrator deems necessary. All emissions subject to standards which are not continuously monitored shall be monitored at least every six months, or six months after commencement of operations and every 18 months thereafter if the incineration unit demonstrates compliance with all emissions standards at each previous monitoring and during intervals between monitoring. If the facility is ever found not in continuous compliance with all emissions standards, it must be monitored not less frequently than every six months.

The Administrator or a State is authorized to request the Administrator of the Agency for Toxic Substances and Disease Registry to conduct a health assessment or health study or survillance, as authorized under section 104(i) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, in any case where exposure to municipal incinerator emissions or ash may pose a potential risk to human health. The incinerator owner or operator may be required to establish and operate, or to pay to establish and operate, programs to detect impacts of the incineration unit or any of its release on humans or the environment.

A recent study of existing municipal waste incinerators prepared for the EPA highlights the importance of trained operator personnel in achieving the good combustion practices necessary to meet safe emissions standards. Under the reported bill, no later than 18 months after enactment, the Administrator shall develop and promote a model State program for training and certifying municipal waste incinerator personnel. In developing the model program, the Administrator should recognize that incinerator facilities vary in size and sophistication of technologies. The Administrator may authorize a State to implement its own program if it has adopted a training program which is at least as stringent as EPA's model program. The program shall include the requirement that all operators and management personnel receive a passing grade on an examination, and participate in continued education on current pollution control technology for municipal incinerators. Every State which permits municipal incineration units should require incinerator operators and management personnel to be certified through an approved state program. As soon thereafter as possible, no municipal solid waste incineration unit should operate without personnel trained in and certified by such a program.

The definition of "municipal waste incineration unit" includes distinct operating units at which commercial, industrial or residential waste, including single and multiple residences, hotels and motels, are combusted. It does not include facilities required to be permitted under section 3005 of the Solid Waste Disposal Act. The Administrator may regulate incinerators which handle hospital and medical wastes under this section, or may set standards for hospital incineration units at least as stringent as the emission standards promulgated under this section.

An incineration unit is considered "new" if it is not operational on or before January 1, 1988, and its construction is not substantially completed. Facilities are considered substantially completed if the cost of required pollution control equipment will be two or more times the cost that would have been incurred if the equipment had been included as part of the permitted design. The price of the control equipment, costs of reconstruction or adding to the structure to permit addition of the control equipment, costs of engineering, and costs of additional land to provide for such reconstruction are among the factors which can be considered in determining whether the cost is twice what the cost would have been if included in the permitted design.

Municipal waste incineration units which are 30 years or older on or after January 1, 1992 shall be deemed new facilities and subject to new facilty standards, except if on such effective date a facility is in compliance with the standards promulgated pursuant to subsection (d), then the facility will not be considered new until 30 years from the date set for compliance.

Municipal waste incineration units will be permitted for a period of 20 years. The conditions for that permit will be based on the regulatory conditions at the time of the issuance of the permit. Every 5 years the existing permit is to be reviewed to determine if the municipal waste incineration unit has met all permit conditions. Even through new regulatory requirements may have been established in the 5 years since the last review of the permit, the existing permit and its existing regulatory requirements are to be continued unless there is evidence which clearly demonstrates that a municipal waste incineration unit has failed to comply with the permit condition or that the municipal waste incineration unit does not have sufficient capacity to manage the ash from the facility during the next 5-year period.

For purposes of meeting the 25 percent recycling requirement, jurisdictions will be given full flexibility in developing recycling programs that best suit local and regional conditions. For the purpose of calculating the 25 percent requirement, jurisidictions may use as a base all waste collected within the jurisdiction from industrial, commercial, institutional and residential wastes. Regional authorities may constitute a single jurisdiction for the purpose of this provision. The authority of the Administrator to promulgate more stringent standards under section 112 or any other provision of this Act is not in any way diminished by this legislation, nor shall requirements of section 165 or section 172(b)(6) be used to weaken the standards under this section.

Any State may submit to the Administrator a program for concurrent enforcement, and 90 days following submission of proposed program shall be authorized to enforce the requirements of this section unless the Administrator determines the State plan does not provide adequate enforcement. The Administrator shall withdraw authorization of State enforcement whenever he determines the State enforcement is not equivalent to Federal enforcement. A State, or any political subdivision, may require more stringent standards, regulations or requirements than that in effect under this section.

Section 130(j) provides that civil penalties collected for violations of the standards and requirements of the legislation shall be used for environmental programs that will be implemented in the jurisdiction where the penalty is assssed. It further provides that such funds should be paid into a trust fund or comparable mechanism established by the court assessing the penalty or the State in which the local government is located and that these funds shall not be used for measures necessary to achieve compliance with the requirements of this Act.

This provision recognizes that the facilities regulated under the legislation are used to achieve a public purpose: the disposal of solid waste. Given these special circumstances, the provision is designed to implement the principle that although it is appropriate to impose some penalty on persons who violate these important requirements, it is not appropriate to remove resources from communities that could apply them to the achievement of greater environmental protection.

Municipal Waste Combustion: Ash Disposal (Section 307)

SUMMARY

A new section 4011 is added to subtitle D of the Solid Waste Disposal Act requiring the Administrator to promulgate regulations for the management, handling, treatment, transportation, reuse, recycling, the disposal of ash from municipal waste incineration units. Such as is declared subject to this new section to this new section and subtitle D, and not subject to subtitle C.

Regulations promulgated for the land disposal of ash shall require the installation of two or more liners, both of which shall be designed, operated, and constructed to prevent the migration of any constituent into such liner during the period of operation and any post-closure period, a leachate collection system above and between such liners, and a groundwater monitoring system. In the alternative, ash may be disposed in a monofill with a single liner leachate collection system and a groundwater monitoring system.

Bottom or combined ash (if the fly ash has been treated in accordance with requirements promulgated under this section), may be placed in a sanitary landfill for disposal, if the landfill meets the revised criteria promulgated under section 410(c), has one liner, a leachate collection system and groundwater monitoring.

The Administrator is directed to promulgate criteria and testing procedures for identifying characteristics of the ash which potentially pose a threat to human health and the environment, taking into consideration all pathways of exposure, including inhalation, ingestion from the food chain or potable water from runoff or leaching into groundwater, and dermal contact. The owner or operator of a municipal waste incineration facility, or any facility involved in the transporting, handling, storing, treating, re-using, recycling or disposing of ash shall be required by the Administrator to test the ash if it is to be disposed in a sanitary landfill or reused. Any ash which fails such a test in any characteristic shall be treated.

The Administrator is authorized to issue a corrective action order whenever the Administrator determines there is or has been a release of any hazardous constituent from any facility regulated under this section. The Administrator may bring a civil action for appropriate relief, including a temporary or permanent injunction, in the United States district court in which such facility is located. Any corrective action order issued by the Administrator shall specify the nature of the corrective action required and shall specify a time for compliance. Any person failing to comply with such order shall be liable for a civil penalty, not to exceed $25,000 per day of noncompliance, assessed by the Administrator.

All facilities treating, storing or disposing of municipal solid waste incinerator ash are subject to proper clsoure, post-closure monitoring and care, and financial responsibility assurances requirements promulgated under this section.

DISCUSSION

Ash from municipal solid waste incineration units is regulated under the Solid Waste Disposal Act, often called the Resource Conservation and Recovery Act (RCRA), which incorporates a hazardous waste regulatory regime under subtitle C, and a non-hazardous management and regulatory regime under subtitle D. Under current law, municipal incinerator ash is subject to subtitle C or subtitle D depending on whether it passes or fails the extraction procedure (EP) toxicity test among other characteristics. Under this test, an acidic solution is run through the ash, and the pollutants in the resulting leachate are measured. If the leachate contains pollutants above certain cut-off levels, it is characterized as hazardous and must be managed and disposed in accordance with requirements of subtitle C.

Tests conducted by government agencies, the Environmental Defense Fund and other organizations have demonstrated that municipal incinerator ash, especially incinerator fly ash, often has hazardous characteristics. While there has been concern expressed that the EP toxicity test is not appropriate for municipal incinerator ash, as the ash creates an alkaline rather than acid environment, there is also recognition that the varied constituency of the municipal waste stream makes it likely that ash would at least some times fail a toxicity test. The current situation makes planning for ash treatment and disposal difficult, if not impossible, because ash which one day passes the toxicity test might fail the next. Different handling and disposal requirements are triggered on the basis of a test whose results cannot be predicted from day to day.

The reported bill establishes a specific regulatory program for municipal incinerator ash which is protective of human health and the environment but is not contingent upon testing. The program includes regulations for the management, handling, storage, treatment, transportation, reuse, recycling and disposal of ash from municipal waste incineration units which meet the requirements of section 3001(i) (1) and (2) of the Solid Waste Disposal Act. This means it applies to ash from facilities that have made the maximum effort to exclude hazardous waste. It also excludes ash from incinerators which themselves are subject to the provisions of subtitle C. This regulatory program will give States and localities the predictability regarding incinerator ash management and disposal needed to foster incineration as a viable solid waste management option.

Recognizing that incinerator ash does not consistently fail toxicity tests, it will not be regulated as a subtitle C waste. Acknowledging that it does sometimes fail toxicity tests and therefore requires more stringent regulation than subtitle D provides, municipal incinerator ash is regulated under a new section of subtitle D which applies only to ash from nonhazardous municipal waste incineration units. The legislation authorizes a comprehensive regulatory program covering all aspects of ash management including handling, treatment, transportation, reuse, recycling, storage and disposal. Regulations shall be promulgated within one year of enactment. Regulations may establish requirements which apply specifically to fly ash, specifically to bottom ash, or to combined fly and bottom ash.

No later than one year after enactment the Administrator shall promulgate criteria and testing procedures for identifying characteristics of incinerator ash which might pose a hazard to human health or the environment. The Administrator shall consider all potential pathways of human and environmental exposure, including but not limited to, inhalation, ingestion of any food or soil particles contaminated by ash or any constituent of ash, ingestion of potable water or aquatic organisms contaminated by surface runoff, leaching, percolation into groundwater or surface water or dermal contact. The criteria and testing procedures shall at a minimum consider methods to determine leaching, total chemical analysis, respirability, and toxicity.

The Administrator may require testing of ash in accordance with the criteria and procedures promulgated pursuant to this legislation by any owner or operator of any municipal waste incineration unit or any facility involved in any way in the handling, storage, transporting, treating, re-using, recycling or disposing of incinerator ash. The Administrator may require testing of fly ash separately, bottom ash separately, or combined ash.

The Administrator is directed to promulgate regulations for treatment of incinerator ash which would render the ash nonhazardous. As defined in section 1004(34) of the Solid Waste Disposal Act, treatment could include any method, technique or process to change the physical or biological character or composition of the ash which would result in its being nonhazardous; but simply combining bottom ash and fly ash, without introduction of a chemical stabilization agent or other processing or neutralization techniques, does not constitute treatment for the purposes of this legislation.

Regulations promulgated under this section shall require disposal of ash from municipal solid waste incineration units, as defined in section 130(k) of the Clean Air Act, in landfills with two or more liners and a leachate collection system above and between the liners, and a groundwater monitoring system. Both liners shall be designed, constructed and operated with materials which prevent migration of any constituent into the liner during the operational life of the facility, including post-closure monitoring period. A lower liner constructed of a layer of recompacted clay or other natural material of at least three feet in thickness satisfied this requirement if its hydraulic conductivity is no more than 1×10^{-7} centimeter per second. Ash which has been tested and fails in any characteristic under the testing procedures and criteria promulgated under this section and which has not subsequently been treated and rendered nonhazardous, shall be disposed of only in a landfill which meets the requirements defined in this paragraph.

Ash which has not failed any characteristic under the promulgated testing procedure and criteria or which has been treated pursuant to promulgated treatment regulations may alternatively be disposed of in a single-lined monofill with a groundwater monitoring system. Such a monofill must be located, designed and operated in a manner which assures there will be no migration of any constituent into the liner during the operational life of the facility, including any post-closure monitoring period.

Regulations shall include post-closure monitoring requirements and corrective action requirements, including financial responsibility. The Administrator is authorized to assess civil penalties up to $25,000 a day for noncompliance with any requirement.

CONSULTATION (SECTION 308)

SUMMARY

Section 308 is a free-standing provision requiring the Administrator to consult with officials of State and local government and their representatives when developing programs for controlling air emissions or managing ash from municipal incineration units.

DISCUSSION

Courts have interpreted the Federal Advisory Committee Act (FACA) to require compliance with a series of "sunshine in government" procedures (advance notice in the *Federal Register,* official transcripts of meetings, summaries in regulatory dockets, etc.) by Federal Government officials whenever they meet with persons organized in groups (trade associations, public interest groups, unions, etc.) to discuss regulatory issues that may be before their agency. Those provisions are generally important safeguards for the administrative process, however, FACA has discouraged close consultation between the various levels of government in the Federal system, because associations representing mayors, county commissioners, state legislators and governors have been precluded from meeting with their counterparts in the Federal agencies on an informal basis.

Section 308 directs the Administrator to work closely with local government officials notwithstanding the provisions of FACA to develop the requirements which will be implemented for municipal waste combustion units under this title. Local officials who own and operate most of these units have expertise which would be valuable to EPA in standard-setting and other areas.

TITLE IV—ACID DEPOSITION CONTROL

BACKGROUND

Sources and acid rain.—Acid rain is created when oxides of sulfur and nitrogen are emitted—most often from electric utilities—and then transformed in the atmosphere or on surfaces into sulfuric and nitric acids. The process is relatively straightforward.

Sulfur (S) is contained in almost all fossil fuels, but especially coal. When burned, the sulfur combines with the oxygen in the air to create sulfur dioxide (SO_2).

Sulfur dioxide (SO_2) is a colorless gas, so it cannot be seen with the naked eye. It is, nevertheless, a powerful lung irritant which can cause lung seizures in asthmatics and other sensitive groups. When SO_2 is transformed into sulfate—a process which begins almost immediately—it escapes regulation under the Clean Air Act. SO_2 emitted by powerplants and other industrial sources combines with oxygen in the atmosphere to form sulfate (SO_4).

Sulfate (SO_4) is an extremely fine particle, capable of reaching the deepest recesses of the lung. Coincidentally, the sulfate particle is also perfectly sized for reducing visibility. This is one reason that airport visibility measurements are sometimes used as a surrogate for sulfate concentrations. When sulfate settles out of the air onto leaves, buildings or other surfaces it attracts water, which converts it into sulfuric acid (H_2SO_4). If inhaled, the lung's own moisture supports the conversion. And, if the SO_4 is washed out by the air by fog, clouds, mist or rain, it has become "acid" rain, as it is popularly called.

Sulfuric acid (H_2SO_4) is powerfully corrosive and can therefore directly damage tissues and materials. But it can also start a chemical reaction of its own, with effects that ripple through an ecosystem. When common dirt is washed in acid, heavy metals that were tightly bound to the soil particles—aluminum, lead, and mercury are three examples—are dissolved, entering the water runoff in massive quantities. Aluminum, for example, increases 1000 percent for every 100 percent increase in rainfall acidity. Thus if the acidity of rain increases 10-fold—which almost all agree is a fair definition of how "acid" today's acid rain is—the aluminum content of rainwater runoff increases 10,000 percent.

Exactly what damages can be fairly attributed to aluminum and other heavy metals freed by acid rain has not been sorted out completely. It is well established that the aluminum is extremely toxic to fish if it reaches lakes and streams. Many scientists believe that it is aluminum which is primarily responsible for the losses of lakes throughout Scandanavia, Canada and New England, rather than the sulfuric acid itself. It is equally clear that some of the other heavy metals—especially lead, cadmium and mercury—can pose a serious threat to human health as drinking water contaminants. Whether they are reaching these dangerous levels because of acid rain and, if so, in how many cases, is unclear.

Nitric acid (HNO_3). Nitrogen undergoes a fairly similar process of conversion: nitrogen (N_2) combines with oxygen (O_2) to form several different oxides (N_2O_2, N_2O, NO_2, etc.). These, in turn, form nitrates which, when exposed to water convert to nitric acid. There are, however, some important differences.

Oxides of nitrogen (N_2O_2, N_2O, NO_2) can be created because nitrogen is found both in fuels and in the air. Roughly 80 percent of the air is nitrogen, and almost all fuels other than natural gas also contain it. But the oxides are not formed until the heat and pressure of the combustion process are brought to bear. The combustion may take place in the cylinder of a car or the furnace of a giant coal-fired powerplant. But in either case, the combustion temperature and pressure are determinants of how much nitrogen is coverted to oxides of nitrogen.

These oxides, like SO_2, are irritants which are regulated under the Clean Air Act. And, again like SO_2, they escape its coverage when they combine with oxygen to form nitrates (NO_3).

Nitrates (NO_3), like sulfates, are fine particles which can reach the cellular levels of the lung. Unlike sulfates, nitrates and other nitrogen-based compounds are considered beneficial to vegetation because they are plant nutrients. For this reason, some scientists and policy makers have tended to minimize the role which oxides of nitrogen, nitrates and nitric acid have played in the damage caused by acid rain and plans for its control.

Within the past several years, however, as scientists have searched for plausible explanations for the forest damages found throughout much of Europe and Eastern North America, they have begun to question whether one answer might be an "over fertilizing" effect of nitrogen compounds. There have also been suggestions that nitric acid could free heavy metals before being taken up by vegetation.

Nitric acid (HNO_3) thus may or may not be the equal of sulfuric acid in terms of the damages caused by acid rain. But the bill, including this title, imposes additional controls on nitrogen for reasons in addition to concerns over acid rain; namely, the role which it plays in the formation of ozone.

Ozone (O_3), better known as an ingredient in "smog", is the indicator for a variety of chemicals which are formed when the combination of nitrogen and organic chemicals (e.g. gasoline) are exposed to sunlight. Ozone is a powerful bleach, so effective at destroying organic matter that it is used by some cities to disinfect their drinking water supplies.

Although the chain of chemical reactions which leads to the formation of ozone and other oxidants is not completely understood, there is no disagreement that there are three essential ingredients. Without all three, ozone is not formed in substantial quantities. These are hydrocarbons, oxides of nitrogen, and sunlight. Historically, the Federal government has relied on a strategy of controlling ozone by controlling hydrocarbons emissions. This has achieved mixed results, leading some States to begin implementing a strategy based on controlling oxides of nitrogen. California has been the leading advocate of this approach and, according to State officials, has enjoyed considerable success.

Both ozone and acid aerosols pervade the atmosphere of eastern North America. Any one of them may pose a potent threat standing alone. But in combination, their impacts are multiplicative. This has been established in laboratory studies, but the extent to which these experiments represent the real environment in unclear. Nitrogen and its compounds, however, play a substantial role whether the specific problem being examined is acid rain, ozone, or the synergistic effects of the two.

The transport and dispersion of gases and particles over distances from tens to thousands of kilometers has been an active area of scientific study for many years. Even before the problem of acidic deposition had been recognized, research on how materials are carried by the winds was already extensive. This earlier body of work, together with more recent studies forms the basis for present efforts to understand the transport of acid-forming substances.

According to the 1987 Interim Assessment of the National Acid Precipitation Assessment Program, the major factors controlling transport and dispersion are the character and movements of meterological systems. There are two extremes with a spectrum of variations in between:

(1) strong, fast-moving cyclones that have the potential to transport large amounts of pollutants rapidly across North America. Generally occurring in winter and spring, these systems bring with them strong horizontal winds, vertical wind shear, and widespread precipitation.

(2) Weak, slow-moving high pressure systems that allow sufficient time for slower-acting processes such as thorough mixing to take place. These systems occur more frequently in the summer and fall and are characterized by local convective storms, primarily near their periphery.

In the case of the storm systems, pollutants may move rapidly hundreds to thousands of kilometers downwind from their sources with limited removal. In the case of slower moving systems, pollutants are mixed vertically causing a buildup of concentrations. Figure IV-1 shows the main storm tracks over North America. These paths represent the directions the predominantly winter storms would take, promoting strong flow conditions. In contrast, Figure IV-2 shows stagnation days over the last 5 years.

As Figures IV-1 and IV-2 illustrate, whether the movement is rapid or slow, the transport of pollutants is a major determinant of local air quality. As a result, areas which ought to have quite satisfactory air quality, instead experience ambient levels of air pollution approaching, or even exceeding, those of industrialized areas. In some cases, such areas have aggressively implemented air pollution controls, risking the loss of industry to other regions or States. In others, the areas may have little or no industry and depend heavily on tourism or recreation, which may be threatened by the imported air pollution and its associated damage.

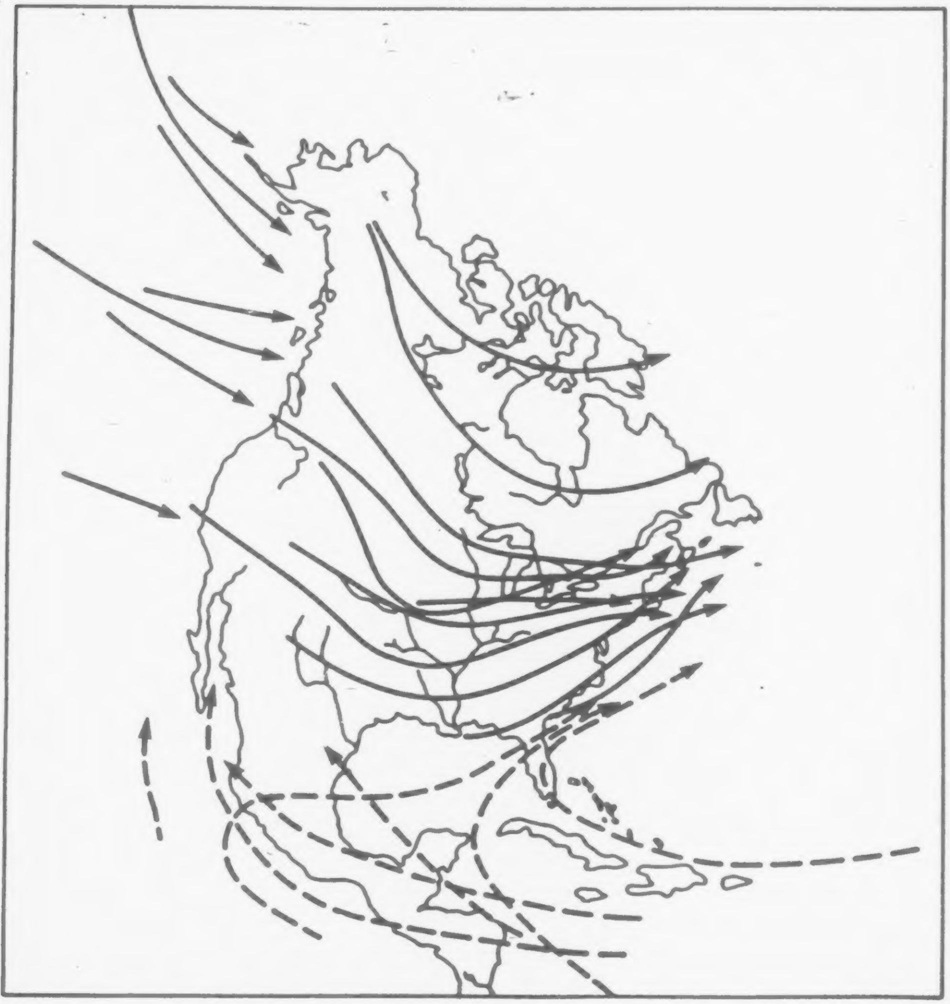


FIGURE IV-1. Major climatological storm tracks for the North American continent. Dashed lines denote tropical cyclone centers and solid lines denote those of extratropical cyclones (Hales, 1984).

	1981	1982	1983	1984	1985
January	0	0	0	0	0
February	0	0	0	0	0
March	0	0	0	0	0
April	22	0	58	0	84
May	89	100	0	98	0
June	40	42	127	145	167
July	45	0	80	0	28
August	412	104	136	12	114
September	222	114	317	156	226
October	180	151	119	128	28
November	104	70	28	37	0
December	0	0	0	71	0
Year	1114	581	865	647	647

FIGURE IV–2. Number of grid-point days of stagnation by month for the years 1981–85, obtained by summing the number of days of stagnation at 2 degrees latitude by 2 degrees longitude grid points (Korshover and Angell, 1987).

Aquatic effects.—The best known environmental effect of acid rain is the damage to aquatic ecosystems. Fish populations decline concurrently with acidification. Fish reproduction requires pH levels above 4.5. Below a pH of 5, death of adult fish begins to occur. Figure IV–3 shows the survival time of fish exposed to varying pH levels. More importantly, at pH levels near 6.0 many species which constitute key elements of the aquatic food chain disappear. Thus Schindler, et al has demonstrated effects to the food chain causing severe damage to the ecosystem at pH levels of 5.93 to 6.13. According to EPA's critical assessment review papers: "Biological effects due to acidification occur for a few species near pH 6.0. Because the biological response to acidification is a gradual one, continuing pH declines below pH 6.0 will result in escalating biological changes with many species adversely affected in the range of pH 5.0–5.5."

FIGURE IV–3. Median survival time (hours) for fish exposed to acutely toxic pH levels (Altshuller and Linthurst, 1984).

Species	Size or age	pH range—										References[1]
		2.0–2.5	2.6–2.8	3.0–3.1	3.2–3.3	3.4–3.5	3.6–3.7	3.8–3.9	4.0–4.1	4.2–4.3	4.4–4.5	
Brook trout[2]	10–60 g	< 1			7							a
	fngl[3]			2–3	3–6	6–18	10–38	14–51	20–270			b
	2 g	1	2	3–6	12–14	45						c
	90 g	1	4	9	18	61–66	334					c
	60–130 g	< 1		1		5–9						d
	50 g					25	66–70					e
	50–90 g					10–32						f
Rainbow trout[2]	1 g						– 8	23	37			g
(2)	130 g		1–4	4	8	18						g
(2)	200–300 g	2	2	5								h
	2–5 g			1	2	3	6	17	83	117	133	i
(2)	2–5 g			< 1	1	2	6	27	133			i
(2)	4.5–15 cm			1		2	3	8	22	70		j
(2)	4.5–15 cm			2		3	7	18	55			j
Brown trout[2]	1–5 g					25	40		120			k
(2)	6 g	1–2		3–7					2–4			l
(2)	60–80 g	3	4	9								h
Arctic char[2]	100–170 g	3	3	4								h
White sucker	7 mo			1	2	5	10	30–200	350	1,000		m
Roach	7–13 cm			< 1	1		3	12				j

[1] Key to references: a Daye and Garside 1976; b Johnson 1975; c Robinson et al. 1976; d Packer and Dunson 1972; e Swarts et al. 1978; f Falk and Dunson 1977; g Kwain 1975; h Edwards and Hjeldnes 1977; i McDonald et al. 1980; j Lloyd and Jordan 1964; k Brown 1981 with 0.1 millimols of calcium; l Edwards and Gjedrem 1979; and m Beamish 1972.

[2] Denote experiments using low-alkalinity water.

[3] fngl: Fingerling, age 0 + (less than 1 yr), weight usually < 50 g.

Species such as frogs and salamanders breed in pools formed from spring snowmelt water. Correlations between pH and amphibian mortality and embryo deformity have been observed. Shellfish are also especially sensitive to low pH values. Molluscs are unknown in waters below pH of 6.0. Figure IV–4 shows the decrease in relative number of species as a function of acidity. Figure IV–5 shows the percent of fish which survive in acidic waters.

Recently, a decline has been observed in the population of the black duck in the Atlantic flyway. Between 1955 and 1973, black duck populations declined by 50 percent, mallards declined by 35 percent, ringed neck ducks have declined by 79 percent and the common goldeneye by 54 percent. This decline has not been observed in three other flyways where acid deposition is less severe. The decline also occurred during the period of greatest emissions increase, 1955–1973. Researchers at Patuxent Wildlife Research Center found that the mortality of young black ducks raised on experimentally acidified wetlands may be increased by as much as three times the normal rate. Gastropods, a crucial element of the ducks food chain providing protein and calcium, do not survive in acidic waters with a pH of less than 6.0. Decreased protein has been shown to have a direct correlation with egg production. Captive mallards fed 50 percent less protein laid 50 percent less eggs. Although the decline of the black duck and similar species may be due to factors other than acid deposition, acid deposition emerges as a leading candidate of concern.

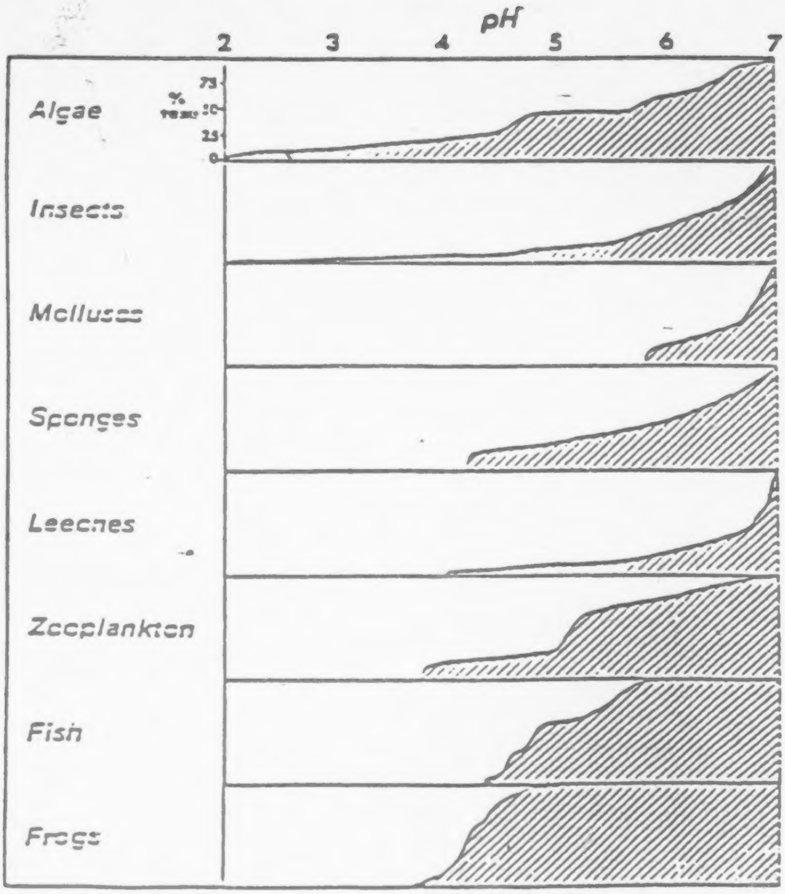


FIGURE IV-4. Percentage variations in number of species with decreasing pH (United States/Canada Work Group I, Final Report, 1983).

FIGURE IV-5. Percent survival of fish exposed to chronically toxic pH levels (Altshuller and Linthurst, 1984).

Species	Size or age	Length of exposure (days)	pH range— 3.2	3.6	4.2–4.4	4.5–4.6	4.8–5.0	5.2–5.6	5.9–6.2	6.5–6.8	7.0–7.5	References [1]
Brook trout	100–300 g	5			60–90						100	a
(2)	10–60 g	7	0	85	100		100	100		100		b
(2)	5 g	11			100		100					c
	50 g	65			0–36							d
	150–360 g	150				0	75			75	100	e
Rainbow trout [2]	200–300 g	100					93	96	97			f
Brown trout [2]	60–80 g	100					94	98	95			f
Arctic char [2]	100–170 g	100					90	100	100			f
Fathead Minnow	1 yr	400				80		75	85	75	85	g
Flagfish [2]	Mature adult	20				36	86	79	100	93		h

[1] Key to references: a Dively et al. 1977; b Daye and Garside 1975; c Baker 1981; d Swarts et al. 1978; e Menendez 1976; f Edwards and Hjeldnes 1977; g Mount 1973; h Craig and Baski 1977.

[2] Denote experiments using low-alkalinity water.

In addition to the damage caused by a long-term decrease in pH, the survival of fish in acidic waters is influenced by increased concentrations of pollutant in spring snowmelt. This phenomenon is referred to as "acid shock" or "acid pulse." Mass mortalities of fish have been observed due to increased concentrations of acidity and heavy metals mobilized by spring snowmelt. Because this phenomenon occurs during a vulnerable point in many species lifecycle, the damage may be especially severe.

Disappearance of fish from natural waters has been documented in the Northeastern United States. According to a 1984 report by OTA, in the Adirondack mountains, at least 180 former brook trout ponds will no longer support populations. A survey of 214 Adirondack lakes conducted in 1975 revealed that 52 percent had surface pH levels below 5.0 and that 90 percent of these lakes were entirely devoid of fish life.

According to the 1987 National Acid Precipitation Assessment Program (NAPAP), Interim Assessment, based on the National Surface Water Survey conducted by EPA, 5 percent of the lakes in Southern New England had pH levels less than 5.0, an additional 5 percent had pH levels between 5.0 and 5.5 and 15 percent of the lakes surveyed had pH levels between 5.5 and 6.0. The results for the Adirondacks show even more damage: 10 percent of the lakes had pH levels below 5.0, 10 percent had pH levels between 5.0 and 5.5, and 27 percent had pH levels between 5.5 and 6.0. In the Upper Peninsula of Michigan, 18 percent of the lakes had pH levels below 6.0.

A recent study by the Ontario Ministry of the Environment (Dillion, Reid et al., 1987) has documented a historic change in pH in Plastic Lake, Ontario, during the period 1979–1985. Direct observation and sampling of the lake indicated that a threefold decrease in alkalinity and a decrease of 0.2 pH units occurred during this period. Because the researchers noted a decline in organic acids of terrestrial origin, they conclude that decreased acidification and biological damage to Plastic Lake is dependent upon reductions in strong acid/SO_4 deposition. Based on chemical surveys, the study notes that Plastic Lake is typical of many thousands of lakes in Eastern North America. The study also states that: "The biota of Plastic Lake have experienced major detrimental effect in the past eight years including fish kills, extinction or near extinction of mullusc species and amphipods, as well as proliferation of acidophilic filamentous algae."

Since aquatic population survival is clearly dependent upon acidity, the vulnerability of lake regions to acidification is used to assess and predict damage to aquatic populations. Because lakes are formed by relatively large watersheds, the largest amount of acid does not fall directly as rain into lakes and streams but passes over and through soil and bedrock before entering an aquatic resource as nitiric acid and sulfuric acid pass over soils and rock they are subject to a variety of reactions. The most important of these reactions are those that buffer the acidity. Surface topography plays an important role in the rate and frequency of these reactions. Steep mountain slopes allow little chance for buffering to take place. The ability of a lake and surrounding soil to buffer acidity is frequently referred to as Acid Neutralizing Capacity or ANC. ANC is measured in microequivalents per liter of water or (ueql/1). A lake with a high capacity for acid neutralizing may have an ANC of 500 ueq/1.

Lakes with extremely low ANC (0–40 ueq/1) are considered "highly sensitive" to acid deposition, according to the Office of Technology Assessment (OTA). Regions with numerous lakes and streams of low ANC include the Northeastern United States, Southeastern Canada, the upper Midwestern United States and mountain regions of the American West. Once the ANC of a lake is completely utilized the lake becomes incapable of further buffering and is considered "acidified." Figure IV–6 shows areas of North America with low ANC.

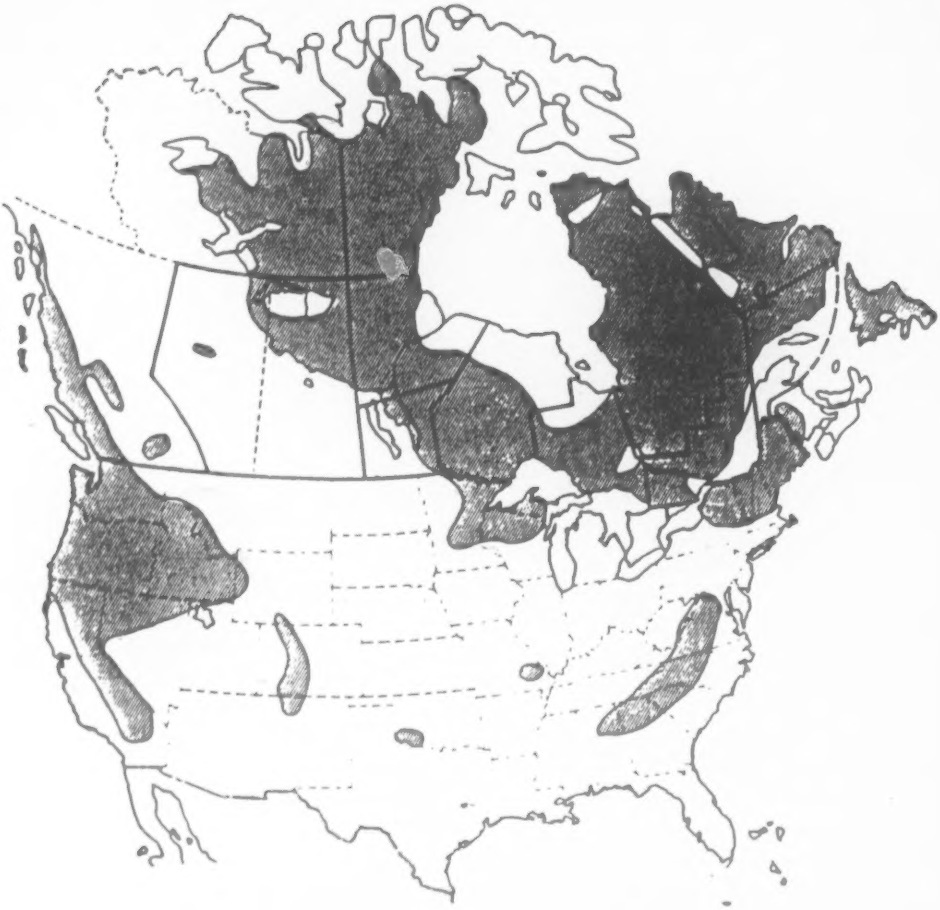


FIGURE IV-6. Regions of North America with low geochemical capacity for neutralizing acid deposition (Galloway and Cowling, 1978).

Studies conducted by the U.S. Environmental Protection Agency (EPA) conclude that in the Northeastern United States, 19 percent of lakes have an ANC of less than 50 ueq/1 and 60 percent of lakes have an ANC of less than 200 ueq/1. Fifteen percent of the lakes in the upper Midwest are estimated to have ANC of less than 50 ueq/1. In the Western United States, approximately 16.8 percent of lakes have an ANC of less than 50 ueq/1. Although these surveys are not complete (in fact the Western lakes survey was conducted during the fall, when pH levels are the most stable), they do suggest that further damage to aquatic resources, both in the East and West, can be expected in the absence of further control.

There have been two large scale lake surveys performed in recent years to estimate the extent of surface water acidification in the United States. The first was the National Surface Water Survey (NSWS), which can be used to predict the status of the 10,758 lakes in the Northeastern United States of greater than four hectares in size. Of these, a subset were chosen as representative, and sampling showed that five percent had no remaining acid neutralizing capacity. The following table summarizes the results of the National Surface Water Survey:

Region	Total number of lakes	Sampled		Percent of total with ANC< zero	Percent of total surface area with ANC< zero
		Number	Percent		
Northeast	10,758	768	7	5.0	2.0
Midwest	11,684	588	5	2.0	<.5
S. Blue Ridge	538	94	2	<.5	<.5
Florida	8,953	148	2	22.0	20.0
West	13,506	720	5	<.5	<.5

Source: National Surface Water Survey, NAPAP.

The validity of these results was born out by the second major lake survey, performed in conjunction with the joint EPA/NAPAP Direct/Delayed Response Project (DDRP). The majority of this project's findings are described in the paper, *Future Effects of Long-Term Sulfur Deposition on Surface Water Chemistry in the Northeast and Southern Blue Ridge Province* (Church and Thornton, et al., U.S. EPA, 1989). This project involved a survey of 3,227 lakes in the Northeastern United States, once again with a surface area of four hectares or greater. Of these, five percent (162) had no remaining acid neutralizing capacity.

The purpose of the DDRP study was to determine whether acidification was direct (i.e. and immediate response to deposition) or delayed (because of soil and watershed characteristics). The study found that acidification and deacidification tends to be delayed. The report states that, "Northeastern watersheds are projected to respond relatively rapidly (i.e., with a lag time of 10 to 20 years) to changes in sulfur deposition." Further, the study predicts that a 30-percent reduction in acid deposition will reduce by 50 percent the number of acidified lakes in the Northeast.

The study also concluded that lakes in the Northeast are in a steady state with regard to acidification. If emissions continue at current levels, according to this theory, pH and ANC levels will remain relatively constant. However, the study found that for the Southern Blue Ridge area, constant emissions will lead to decreasing lake pH and ANC. Because soils in the Southeastern United States have a higher capacity for temporary retention of sulfur, there is a considerable lag in the response of aquatic systems. Surface water acidification in this region is delayed as a result, but damage to lakes and streams in the Southeast will also be more difficult to reverse. Data for lakes and streams in the Mid-Atlantic Appalachian region have not yet been published.

The "steady state" hypothesis has been disputed by several sources, including the Plastic Lake study cited above. Because there is no long-term data, it is impossible to say that lakes are in a steady state. Biological effects can lag for years behind the chemical steady state.

Furthermore, both DDRP and NSWS data are not representative of true conditions because lakes with a surface area of less than four hectares were not sampled. There are many such lakes in mountain regions that fall below this size cutoff, which was used by both studies to simplify the task of sampling. Furthermore, it appears that these small lakes acidify more easily than larger lakes.

Some light can be shed on the effect of this exclusion using data collected by New York States Adirondack Lake Survey Corporation (ALSC). The ALSC was created by New York State to perform a detailed survey of lakes in the Adirondack mountains. Between 1984 and 1988, the ALSC sampled 1,469 lakes in the Adirondacks, including lakes smaller than one acre. This sample represents 53 percent of the total number of 2,772 lakes in the region.

For example, NSWS data show 11 percent of Adirondack lakes with no remaining acid neutralizing capacity. ALSC sampling for the same region found that 26 percent of lakes have no remaining acid neutralizing capacity. The ALSC survey also found no fish life whatsoever in 24 percent of the lakes sampled. The disagreement between the two data sets can be explained largely by the inclusion of smaller lakes. ALSC data for lakes larger than four hectares agrees substantially with NSWS data.

Because lakes with very low acid neutralizing capacity are especially vulnerable to acid deposition, the OTA has estimated that in the Eastern United States, approximately 3,000 lakes and 23,000 miles of streams have already become acidified or have virtually no acid neutralizing capacity left. In Canada, the Ontario Ministry of the Environment has estimated that 10,000 lakes in the eastern part of the country are currently acid altered.

Without further controls, much more extensive damage is possible. Based on the observation that 25 percent of the land in the Eastern United States is not sufficiently buffered to prevent acidity from being transported to bodies of water, OTA estimates that 117,000 lakes and 112,000 miles of streams are vulnerable to damage by acid rain. Figure IV-7 shows the number of lakes and streams at risk in the Eastern United States.

FIGURE IV-7. Total estimated lake and stream resources in the acid-sensitive regions of the Eastern United States ("Regional Assessment of Aquatic Resources at Risk From Acid Deposition," prepared for OTA by The Institute of Ecology, 1982).

Region	Sensitive area (mi ^{2})	Total lakes		Total streams (mi)	
		Number	Acres	1st order	2d order
1. Eastern Maine	26,398	1,425	582,825	9,714	3,485
2. Western New England	29,666	1,543	763,785	15,308	4,569
3. Adirondacks	14,066	1,139	231,217	5,289	3,024
4. East Pennsylvania/South New England	20,947	1,320	118,800	8,400	2,556
5. West New York/Pennsylvania	25,051	376	16,920	7,114	1,678
6. Appalachian Plateau	16,190	13	29,510	7,350	2,299
7. Blue Ridge/Great Smoky Mountains	20,964	126	14,868	10,901	3,396
8. Coastal Plain	9,264	241	8,917	1,547	713
9. Lower Mississippi	13,075	170	56,610	5,374	1,255
10. Indiana/Kentucky	8,603	9	603	2,805	989
11. Central Wisconsin	12,141	583	187,726	2,683	728
12. Wisconsin/Michigan Highlands	19,229	5,307	801,357	5,037	1,737
13. Northeast Minnesota	10,560	1,637	473,093	1,637	475
14. Central Minnesota	18,870	3,170	323,340	4,831	2,529
Total	245,024	17,059	3,609,571	87,990	29,433

Recent findings suggest that coastal waters are also being damaged by acid rain. A 1988 study by scientists at the Environmental Defense Fund found that one quarter of all nitrogen contributed by human activity to the Chesapeake Bay originates as acid rain and associated dry deposition falling directly into the Bay and its watershed. The decline of coastal estuaries is attributed in large measure to increased nitrogen, causing excessive growth of algae which chokes off light and oxygen supply to other marine life. Only fertilizer runoff surpasses atmospheric nitrogen as a source category in the Chesapeake Bay.

Forest resources.—Recently, several cases of unexplained regional scale forest decline have been observed throughout the United States. Reported forest declines include white pine in the Eastern United States, red spruce in the Appalachian mountains, yellow pine in the Southeastern United States and declines in Canadian sugar maple. In the San Bernardino mountains near Los Angeles, ozone has been unambiguously identified as the primary causal agent in forest decline, according to NAPAP. Ozone has also been determined to cause visible injury to sensitive genotypes of white pine throughout the Eastern United States. Although the greatest amount of current attention centers on ozone's role in forest decline, the effects of increased acidity of rain and increased levels of sulfur dioxide are also thought to contribute to forest decline. Because many of the more prominent cases of forest decline occur in above cloudbase forests, where ozone levels are high and the rainfall is highly acidic, the combined effects of acid rain and ozone are difficult to distinguish.

According to NAPAP, red spruce, located from sea level in Coastal Maine to 1,500 meters in the Appalachian mountains, have experienced a decline beginning in the 1950s. Initially, according to NAPAP, the decline was only evident at high altitudes but more recently, growth reductions and foliar symptoms have been observed at low levels as well.

According to NAPAP, studies by Siccama et al. (1982) and Scott et al. (1984) show that the decline is the most severe at areas of high elevation; on Camel's Hump and Whiteface Mountain in the northeast, there has been a 30 percent to 70 percent decrease in live spruce since the mid-1960's. Declining spruce trees typically die back from the top of the tree downwards and from the outside of the tree inwards. These damage patterns are reversed for lower elevations along the Coast of Maine. These latter symptoms are similar to symptoms reported for Norway Spruce in Central Europe. Jagels (1986) examined spruce cores from sites off the Maine Coast and found that growth reductions and foliar symptoms were the most severe for sites within thin organic soils on granite bedrock. According to NAPAP, the author argues that these effects are remarkably similar to those observed in Central Europe where nutrient leaching on poor soils is strongly suspected.

Yellow Pine in the Southeastern United States has also experienced a widespread decline although no visible symptoms of damage are present. In Georgia, fully grown stands of yellow pine examined on mountain sites during 1972–1982 were found to be only 25 to 50 percent as tall as yellow pine stands of similar age at similar locations had been during 1956–1961. As a general matter, researchers express concern that chronic, mutually aggravating stresses from ozone and acid deposition may be responsible for the reduction. Such a situation would have extraordinary economic implications for this major wood producing region of the country.

Crown dieback symptoms have also been reported for sugar maple in Southeastern Canada and in the Northeastern United States. Sugar maple as a source of maple syrup is a major economic concern in these areas.

Although air pollution and acidic deposition are not yet fully confirmed as the primary causal agents responsible for most forest decline observed in this country, studies conducted in the laboratory have shown acute and chronic injury in deciduous and coniferous seedlings and saplings when exposed to simulated "acid rain" solutions of pH less than 3.0. Chappelka and Chevone (1986) found that root growth in white ash seedlings was 12 percent less for seedlings exposed to simulated acid rain of pH 3.0 than for seedlings exposed to rain at a pH of 5.6. Raynal et al. (1982) observed that germination was inhibited for red maple and yellow birch seeds upon exposure to soil of pH 3.0. Exposure to SO_2 has been found to predispose plants to disease. Sulfur dioxide is readily absorbed by plants in both dry and wet forms and is dissolved inside the plant leaf to create sulfuric and nitric acids. These acids alter cellular biochemistry causing acute injury and death.

A recent study (Zoettl and Huettl, 1986) identified acid deposition as the primary growth-limiting factor in high altitude Norway Spruce in Southwestern Germany. Forests in this region have experienced serious decline, and trees exhibit disease symptoms which are similar to those observed in North America. Together with photooxidants, acid deposition was found to cause increased leaching of easily mobilized nutrients from the soil. When these nutrients were reintroduced to the soil on several test plots, the trees recovered.

The effects of point source emissions of SO_2 on nearby forest ecosystems are well documented. Freer-Smith (1984) exposed various hardwood seedlings to sulfur dioxide concentrations of 100 parts per billion (ppb) for 104 hours per week for 60 weeks. A 20 to 50 percent reduction in total shootweight was observed. Such an exposure (a weekly average of 62 ppb) is well within the 100 to 200 ppb range which NAPAP estimates occurs near point sources and in urban areas. Ponderosa pine, after seven months of exposure to 150 ppb sulfur dioxide, exhibited pathological changes in mesophyll cells according to Karenlampi and Houpis (1986).

Exposure of red and jack pine to sulfur dioxide levels of 100 ppb for 40 hours per week for nine weeks resulted in a 10 to 20 percent reduction in height and growth according to Riding and Boyer (1983).

According to the Congressional Research Service, one estimate of the forest related damage by Crocker concludes that close to $1.75 billion (1978 dollars) in forest related damage occurs in the Eastern United States each year as a result of air pollution and acidic precipitation. Crocker estimates the damage that would not occur under pristine conditions and includes losses from outdoor recreation, water storage and wildlife habitat as well as timber losses. A similar study by Callaway et al. estimated that if radial growth of forests were reduced by 10 to 20 percent annual losses would be approximately $340 to $510 million for the Adirondacks alone.

Materials damage.—Acid rain is known to cause materials damage. Among the materials affected are building stone, rubber, zinc, steel, leather, paint, and textile. Acid rain is thought to accelerate rust by as much as 30 percent. Acid rain contributes to premature soiling of paint and other materials. Two kinds of materials damage exist. Acid rain may damage culturally significant buildings and statuary. The effect of this damage is difficult to quantify, often irreplacable artifacts may be destroyed. Massachusetts estimates that it spends 13 million dollars per year refurbishing culturally significant buildings and statuary. A study by Callaway focusing on the maintenance costs for historical structures in 17 Eastern States estimated that between $22 million and $107 million is spent annually.

Acid rain may also damage replacable materials such as rubber and steel. Although these losses are potentially quantifiable, they too are difficult to estimate. In general, acid rain accelerates naturally occurring damage and is not the sole source of materials degradation. Still estimates of the cost savings available from a major reduction in sulfur dioxide emissions range into the billions of dollars. According to the Congressional Research Service, dollar values are placed on only a few common materials which may underestimate total materials damage.

According to Salmon, based on a study of 32 construction materials, (these 32 materials represent only 40 percent of construction materials exposed to air pollution) the nationwide cost for 1968 was $3.8 billion in damage due to air pollution. A 1974 paper issued by EPA estimated that the nationwide cost of air pollution damage to materials is approximately $2.2 billion annually. Ozone damage to rubber alone has been estimated to cost $395 million by Mueller and Stickney. Cleaning costs for households and for exterior paints have been estimated by Liu and Yu of EPA's Office of Research and Development to cost $36.2 billion annually. The effect of acidic deposition on materials in 17 midwestern and northwestern States was estimated to be close to $2 billion in 1984 dollars by Mathtech.

Visibility damage.—Emissions of SO_2 and NO_x contribute to visibility impairment. Sulfates and nitrates that do not fall to the earth as acid rain remain suspended in the air scattering light and creating regional haze. Visibility impairment is frequently perceived of as a surrogate for air quality. Visibility impairment has a negative aesthetic impact, particularly in national parks, and an impact on transportation operations, especially air traffic. Visibility is generally worse in the summer than in the winter.

Extension data exists on visibility in the form of visual range estimates made by trained observers at airport weather stations. Based on this data the National Academy of Sciences has concluded that: "It is now well established that, on average, sulfates and associated water account for about 50 percent of visibility reduction in the East, slightly less in urban areas, but somewhat greater in nonurban areas." According to NAS, one study indicated that sulfates and associated water in nonurban areas accounted for approximately 75 percent of the light extinction.

According to NAS, the area of greatest light extinction (worst visibility) occurs east of the Mississippi and south of the Great Lakes. This area also corresponds to some of the worst air quality in the country. Figure IV-8 shows the median annual visual range distribution for the United States in 1976.

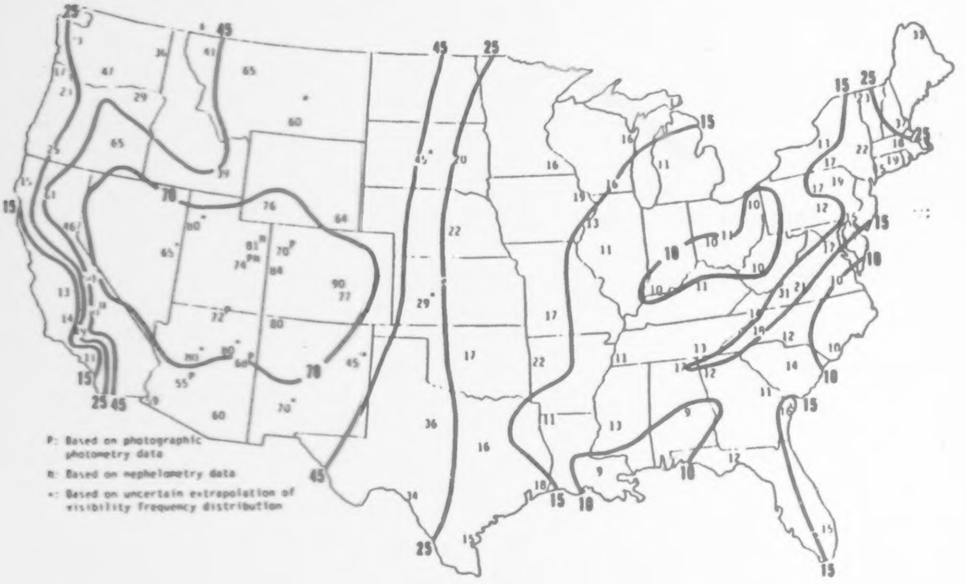

25
45
70
45
25
15
25
15
10
25 45
P: Based on photographic photometry data
N: Based on nephelometry data
*: Based on uncertain extrapolation of visibility frequency distribution

FIGURE IV-8. Median annual visual range (in miles) at suburban nonurban locations in the United States, 1974-1976 (Trijonis, 1982).

Visibility is a major issue in the national parks. Air pollution in the Grand Canyon impairs visibility approximately 100 days per year. Studies by the National Park Service have determined that sources as distant as 300 miles contribute significantly to air quality degradation in some parks. Air quality is endangered in approximately one-half of the national parks. Visual range in the eastern United States, including in national parks, such as the Shenandoah, is frequently less than 15 miles. Figure IV-9 shows changes in visual range distribution for the Eastern United States from 1948 to 1983.

Estimating the costs of decreased visibility is difficult. Latimer, et al. have estimated that the value of good visibility is approximately 2 dollars per person per year. Based on this assumption, a 13 percent increase in visibility is worth approximately 4.2 billion dollars.

A study funded by the Electric Power Research institute examined the value to visitors of improving visibility at the Mesa Verde National Park and the Smokey Mountain National Park. The study concluded that total annual benefits to be derived from increased visibility at the Smokey Mountain National Park ranged as high as 8.5 to 10.5 million dollars.

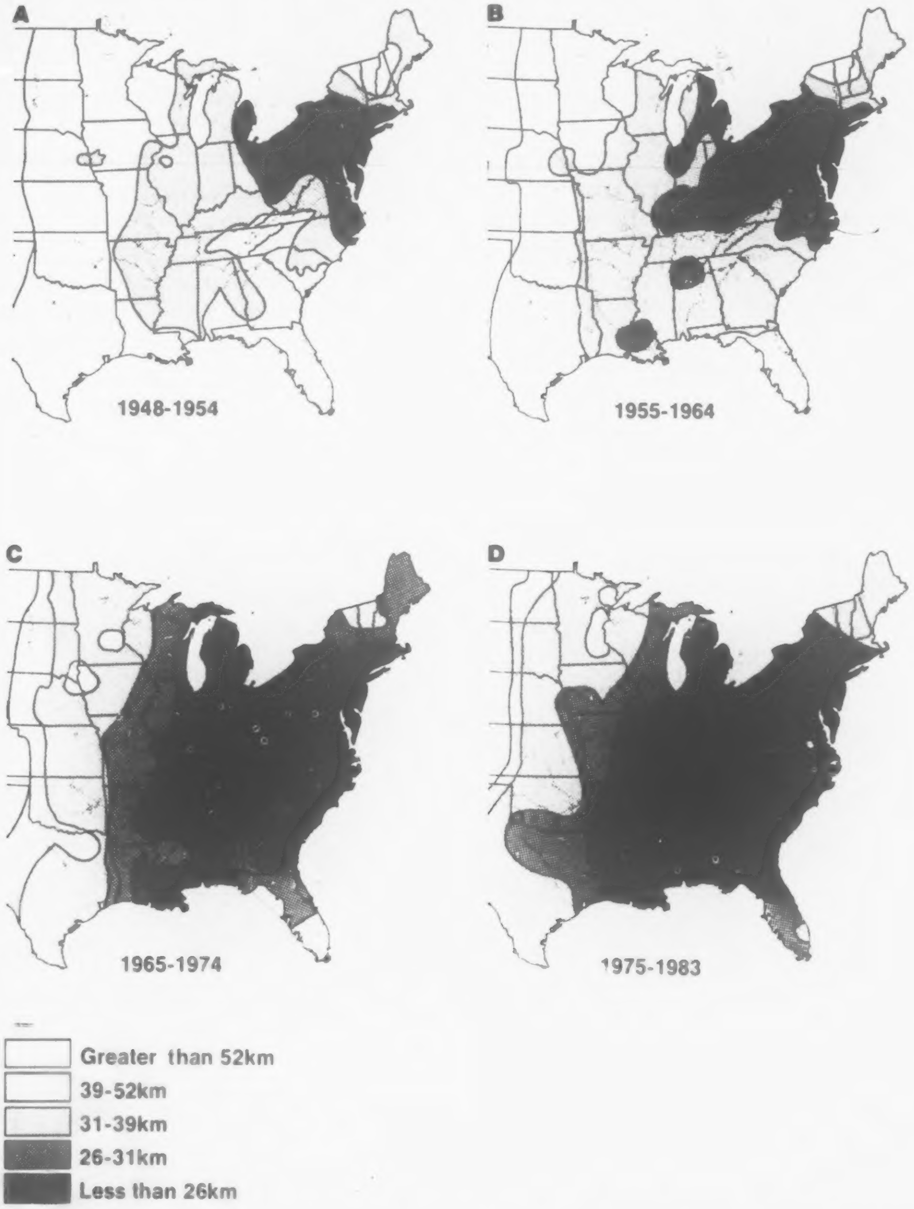

A
1948-1954
B
1955-1964
C
1965-1974
D
1975-1983
Greater than 52km
39-52km
31-39km
26-31km
Less than 26km

Figure IV-9. Spacial distribution of average airport visual range in the Eastern United States during Summer from 1948 to 1985 ("Air Quality in the National Parks, Energy and Resource Consultants, Inc., 1988).

Linearity.—One important issue related to transport is the linearity of the relationship between emissions and deposition. Because of the variety of deposition methods and the effect of atmospheric chemistry and transport, suggestions have been made that there may not be a linear correlation between emissions and deposition.

This counter-intuitive view remains unsupported. The National Academy of Sciences (NAS) has concluded "there is no evidence for a strong nonlinearity in the relationships between long-term average emissions and deposition." Because reactions with NO_x take place rapidly and efficiently, NAS concluded that any nonlinearity would be a function of SO_2 emissions alone and would therefore reveal itself in a difference between the regional deposition ration of NO_x and SO_2. Since the percentage of deposition for both precursors is approximately equal, locally as well as when transported, NAS concluded that, "It is therefore improvable that the oxidation of SO_2 is sufficiently hindered by a lack of oxidant to cause a disproportionately small reduction in precipitation as a result of a given reduction in SO_2 emissions."

On the contrary, evidence collected by the National Acid Precipitation Assessment Program suggests that reductions in total regional emissions will lead to comparable or nearly comparable reductions in ambient levels.

The 1987 Assessment concluded that in the eastern United States sulfate aerosol is more uniformly distributed than sulfur dioxide, and reported the following:

> High concentrations of sulfate aerosol can build up in stagnating air masses as sulfur dioxide is converted to sulfate aerosol (SIC). During a sulfate episode, high sulfate aerosol concentrations may exist over large areas and persist for several days. Sulfate episode conditions on a regional scale occurred about one-fifth of the time in the Northeastern United States during the EPRI-SURE study.

The assessment did not directly confront the validity of the findings contained in the 1986 NAS/NRC report *Acid Deposition Long Term Trends* cited earlier. However, the Assessment did state that NAS/NRC conclusions were consistent with the extensive work undertaken by NAPAP, as well as that of other researchers. Specifically, the NAPAP Assessment said the following:

> The qualitative interpretation of tendencies given in the National Research Council report is consistent with the results of the more quantitative analyses. . . . A highly probable, but not yet verified, explanation for the decrease in sulfate concentrations is the very similar trend in sulfur dioxide emissions in the eastern United States.

It may not be possible during the foreseeable future to conclusively demonstrate whether the relation between emissions and deposition is linear (or nearly so) or non-linear. However, the convergence of different lines of evidence combined with the nearly total absence of other evidence to the contrary suggest that the relationship is linear or very close to it. Given the fact that the accumulation of evidence has strengthened the credibility of the NAS/NRC conclusions, some of the most relevant of them bear repeating:

1. There is a strong association between emissions densities of SO_2, concentrations of sulfate aerosol, visibility ranges, wet precipitation concentrations of sulfate and sulfate fluxes in studied streams.
2. Since the 1920's SO_2 in the Northeastern United States has fluctuated at or near current levels.
3. Regional differences over time in amounts of SO_2 emissions did not appear until about 1970. Since that time, evidence of deposition indicates that greatest rates of increase have been in the Southeast, with somewhat lower increases in the Midwest and slight decreases in the Northeast.
4. Changes in stream sulfate were, on a regional basis, consistent with changes in SO_2 emissions.
5. Data on some lakes suggest that changes in their alkalinity have occurred during the past 50 years, but these are too great to have been caused by increases or decreases in acid deposition alone. They most likely resulted from other human or natural activities (e.g. changes in land use).

In summary, there is every indication, from all available evidence, that reducing emissions on a regional scale will reduce acid deposition on a regional scale on a one-to-one basis, or something close to it.

Human Health.—There is no disagreement among medical researchers that precursors of acid rain are a serious health threat. Collectively, the pollutants which form acid rain pose a threat to human health so severe that one leading researcher and pediatrician from the Mt. Sinai Medical Center in New York described them as the third leading cause of lung disease in the United States, trailing only active and passive cigarette smoking. In testimony before the Subcommittee in February 1987, Dr. Philip Landrigan stated:

> There is a limit to what you, as Senators, can do about people's desire to smoke. With regard to occupational exposure, you have good laws on the books, but you have the problem of having to enforce those laws through hundreds of thousands of workers across the country. That is obviously a mind boggling task even if OSHA were up to it.
>
> But in the case of acid rain, there is really a finite number of major sources of acid air pollutants. They can be targeted with relative ease. In fact, they have been pretty well targeted already by the EPA. A few swift and sure legislative strokes could deal with these sources.

Several lines of converging evidence—epidemiologic studies of populations, controlled studies of human volunteers, and toxicologic studies in cell systems and animals—all indicate that current levels of acid air pollution produce substantial adverse health effects in certain segments of the American population and particularly in children. These are detailed in a February 27, 1989 CRS Report for Congress entitled *Health Benefits of Air Pollution Control: A Discussion.*

Studies of animals forced to breathe a fine mist of sulfuric acid show that the subjects are less able to mobilize the lung's defenses and clear foreign matter from their respiratory systems. Because human and animal lungs react in the same way, there is serious concern that humans breathing an acid mist will also lose their ability to defend against pollution changes.

The most troubling aspect of this is that such changes are one of the signals of bronchial disease. Thus, if the suggestions of the animals studies are correct, similar reactions would be expected in humans. Specifically, researchers would expect colds, and bronchial infections and even deaths to increase when acid levels are high and decrease when they are low. This is what has been found.

The most significant human health research suggests that air pollution may play a role in increased human mortality. According to recent studies by Harvard public health researchers, between 2 to 4 percent of the excess deaths in New York City are due to air pollution. On a national level, ambient levels of sulfates and fine particles were found to have a consistent association with higher mortality, ranging from between 3.4–6.9 excess deaths per year per 100,000 people per part per million. This translates into approximately 5 percent of annual excess mortality being associated with sulfate and fine particle pollution.

Researchers at the National Bureau for Economic Research have estimated the impact of specific air pollutants on race specific neonatal mortality rates. According to the researchers:

> The results suggest that sulfur dioxide is the dominant air pollutant in newborn survival outcomes. There is also evidence that an increase in sulfur dioxide raises the neonatal mortality by raising the percentage of low-birth weight births. Based on marginal willingness to pay computations, we estimate that the benefits of a 10 percent reduction in sulfur dioxide levels ranges between $54 million and $1.09 billion in 1977 dollars.

In 1989 dollars, this range is $102 million to $2.06 billion. The researchers note that the infant mortality rate is approximately equal to the mortality rate of 55 to 64 year olds.

Published results of the highly regarded "Harvard Six-City Study found that exposure to acid air pollution, particularly to fine particles associated with airborne sulfates, produces respiratory symptoms in children. In this study, public health researchers from Harvard University studied the relationship between ill health and air pollution in six cities representing a spectrum is severity of air pollution. Their results show a direct linear relationship between acid aerosol concentrations in these six cities and incidence of bronchitis in children. This effect is seen in both children with a prior history of wheezing, as well as in children without such history. The effect is greater, however, among children who wheeze. Researchers are currently expanding this study to 24 cities.

One group of individuals that is especially sensitive to the precursors of acid rain is asthmatics. Asthma is one of the leading diseases afflicting children under 18, causing more hospitalizations in this group than any other disease. According to the American Lung Association, as much as eight to ten percent of the population may have asthma. Approximately one third of all asthmatics are children under 18. Up to an additional 20 percent of the population has "hyperactive airways," which cause a reaction to air pollution similar to that observed in asthmatics.

Each year, asthma accounts for 48 million days spent in bed, 111 million days of restricted activity, and nine million days lost from work. This disease accounted for 6.5 million doctor vistis in 1985 and 454,000 hospital discharges in 1987. In 1985, 51 million prescriptions were filled for asthma, a 200 percent increase since 1972. The incidence of asthma appears to be increasing, and air pollution is one of the causes under study. The asthma-related death rate doubled between 1977 and 1986.

Asthmatics, without other health programs, when exposed to levels of sulfur dioxide as low as 0.25 parts per million (ppm), for exposure periods as brief as five minutes during exercise, develop symptomatic and objective evidence of bronchial constriction, or tightening of the airways. Short-term exposure to 0.3 ppm of nitrogen dioxide increases the incidence of exercise induced broncho-spasm and airways hyper-reactivity in such asthmatic subjects. Acid air pollution is capable of producing pulmonary dysfunction, bronchial constriction and wheezing. These effects are exacerbated by exposure to cold air.

Many studies document the coincidence of hospital admissions and exposure to acid aerosols and sulfur dioxide. In a series of studies conducted in Southwestern Ontario between 1974 and 1978, researchers found that admissions to hospitals were significantly correlated with levels of sulfate and ozone, as well as with temperature.

Pulmonary function in primary school children in the Netherlands was measured before, during, and after the January, 1985 acidic pollution episode which caused elevated exposures throughout northwestern Europe. During the episode, the Dutch children were exposed to respirable particulate and SO_2 concentrations in the range of 200–500 μ/m3. Their baseline respiratory functions had been measured four to six weeks ealier, when the pollutants were below 100 μ/m3. During the episode, the children experienced a 3 percent to 5 percent decrease in lung function, which was still present 16 days later.

During the same episode, average concentrations of SO_2 and suspended particulates were 800 and 600 μ/m3 in the Ruhr District in West Germany. As a result there were significant increases in deaths, hospital admissions, outpatient visits and ambulance deliveries to hospitals when compared to a neighboring less polluted area.

Populations at particular risk are childen whose respiratory systems are much more narrow and less well developed and whose rates of ventilation are higher than adults. Thus, minor irritation caused by air pollution, which would produce only a slight response in an adult, can result in a dangerous level of swelling in the lining of the narrow airway of a child. Moreover, children's airways are small and they have markedly inceased needs for oxygen for their size. They breathe more rapidly and inhale more pollutant per pound of body weight than do adults. If during the early years of life a child is highly exposed to air pollutants, the risk of long-term damage to the lungs increases.

Another factor which makes children more vulnerable than adults to air pollutants is their increased frequency of respiratory infections. The interactions of the infectious process with irritating pollutants intensify the damage to the airways. Furthermore, the processes for repair of damaged airways are less efficient in children than in adults because of the small caliber of the airways and the resultant partial obstruction to the flow of air.

Other groups particularly at risk are the elderly and adults with pre-exising chronic heart or lung disease.

Respiratory disease and symptoms represent the largest and best docmented category of health effects. However, evidence suggests that there may also be indirect health effects linked to acid rain.

Increased acidity in drinking water can mobilize heavy metals. Acidified waters can dissolve such toxic metals as aluminum, copper, lead and mercury. It can also release such toxic substances as asbestos from soils and rocks in watersheds, lakes and from drinking water distribution systems. The effects of exposure to these contaminants are well known, ranging from headaches to possible death.

Of particular concern is lead and mercury. Acidification of drinking water sources significantly increases lead content. Leader water pipes become particularly hazardous as water acidity increases. The effects of lead on the brain function are increasingly reported. These effects include adverse effects on children's behavior and intelligence.

Mercury can occur as several species. Of concern here is methylmercury, which has a tendency to bioaccumulate in nature—a tendency dependent on acidification. These effects of methyl-mercury on the fetus are the best documented example of a metal compound that affects the development process of the central nervous system including postnatal growth retardation.

McDonald (1985) estimates that between 25,000 and 350,000 people in the rural Northeast alone may drink water exceeding the standard for lead, cadmium, or mercury. Although the influence of acid deposition on levels of these metals in drinking water is not firmly established, any increase in acidity is likely to result in creased erosion and is thus a major source of concern.

Trends in Man-Made Emissions.—According to the National Acid Precipitation Assesment Program, 23.1 million tons of sulfur dioxide and 20.5 million tons of nitrogen oxides were emitted from anthropogenic sources in 1985. Major sources of SO_2 released in 1985 were electric utilities (16.1 million tons), industrial combustion (2.8 million tons), industrial processes (2.8 million tons), and transportation (0.9 million tons). Major sources of NO_x released in the same year were electric utilities (6.7 million tons), industrial combustion (3.3 million tons), industrial processes (0.8 million tons), and transportation (8.8 million tons). State-by-State emissions data from 1985 are given in Figures IV-10 through IV-13.

Electric utilities have become a major source of sulfur dioxide and nitrogen oxides emissions in the United States since 1960; in earlier years, sources were smaller and more dispersed. Today, sources of sulfur dioxide are generally large and centralized and emit from fairly high stacks at high temperatures and exit velocities. More than 90 percent of the sulfur dioxide emitted from powerplants comes from older facilities, which are generally regulated less stringently than plants under the Act's new source performance standards.

Coal combustion has been the largest source of SO_2 emissions in the United States throughout the period from 1900 to the present. However, coal-fired power plants have only recently become a major contributor of SO_2. Until about 1960, most coal combustion occurred in manufacturing facilities, residences, commercial establishments, and locomotives. Figure IV–14 shows historical trends in SO_2 emissions by source.

FIGURE IV-10. Anthropogenic SO_2 emissions in 1985 (thousands of tons) by category by state (NAPAP Emissions Inventory, Version 2).

STATE	UTILITIES	INDUST. COMB.	INDUST. PROCESSES	TRANSPORT	OTHER PT SOURCE	OTHER AREA SOURCE	STATE TOTALS
Alabama	542	55	98	15	0	15	725
Arizona	118	14	575	10	0	1	718
Arkansas	60	20	16	11	0	2	110
California	5	39	47	128	1	6	227
Colorado	68	7	4	10	1	2	93
Connecticut	61	8	0	6	3	9	87
Delaware	59	23	32	2	1	1	118
Dist. of Col.	1	0	0	1	3	2	7
Florida	527	25	58	36	1	14	660
Georgia	999	54	31	24	1	4	1,113
Idaho	0	8	21	4	0	3	37
Illinois	1,035	125	179	27	18	8	1,391
Indiana	1,475	331	70	22	23	17	1,938
Iowa	195	62	5	11	14	3	288
Kansas	102	16	26	14	0	1	158
Kentucky	765	59	32	14	2	6	878
Louisiana	76	140	132	36	0	18	402
Maine	10	51	4	3	2	9	79
Maryland	212	31	16	23	5	23	309
Massachusetts	264	34	1	12	5	24	340
Michigan	401	85	30	20	6	8	551
Minnesota	108	21	14	14	3	6	166
Mississippi	103	13	46	12	0	2	175
Missiouri	974	69	107	17	4	6	1,178
Montana	16	12	50	8	0	4	91
Nebraska	46	3	4	10	0	1	64
Nevada	33	1	1	4	0	1	40
New Hampshire	74	5	0	2	1	3	85
New Jersey	102	14	15	28	3	22	183
New Mexico	78	15	170	6	0	2	271
New York	409	142	6	27	23	59	665
N. Carolina	346	90	15	18	5	9	483
N. Dakota	144	38	30	5	1	3	221
Ohio	2,194	251	47	33	21	15	2,561
Oklahoma	82	25	28	13	0	1	150
Oregon	2	13	7	15	0	7	45
Pennsylvannia	1,189	87	80	28	8	37	1,429
Rhode Island	2	2	0	1	1	3	9
S. Carolina	145	61	16	10	1	4	237
S. Dakota	34	3	1	4	0	1	43
Tennessee	804	103	42	18	4	6	977
Texas	523	342	519	90	9	22	1,505
Utah	24	20	18	5	1	4	72
Vermont	1	2	0	2	0	3	7
Virginia	131	114	27	21	9	11	312
Washington	69	20	48	19	3	10	169
West Virginia	932	68	50	6	1	2	1,058
Wisconsin	380	102	8	13	3	8	514
Wyoming	137	24	36	5	0	3	206
TOTALS	16,054	2,847	2,763	864	189	428	23,146

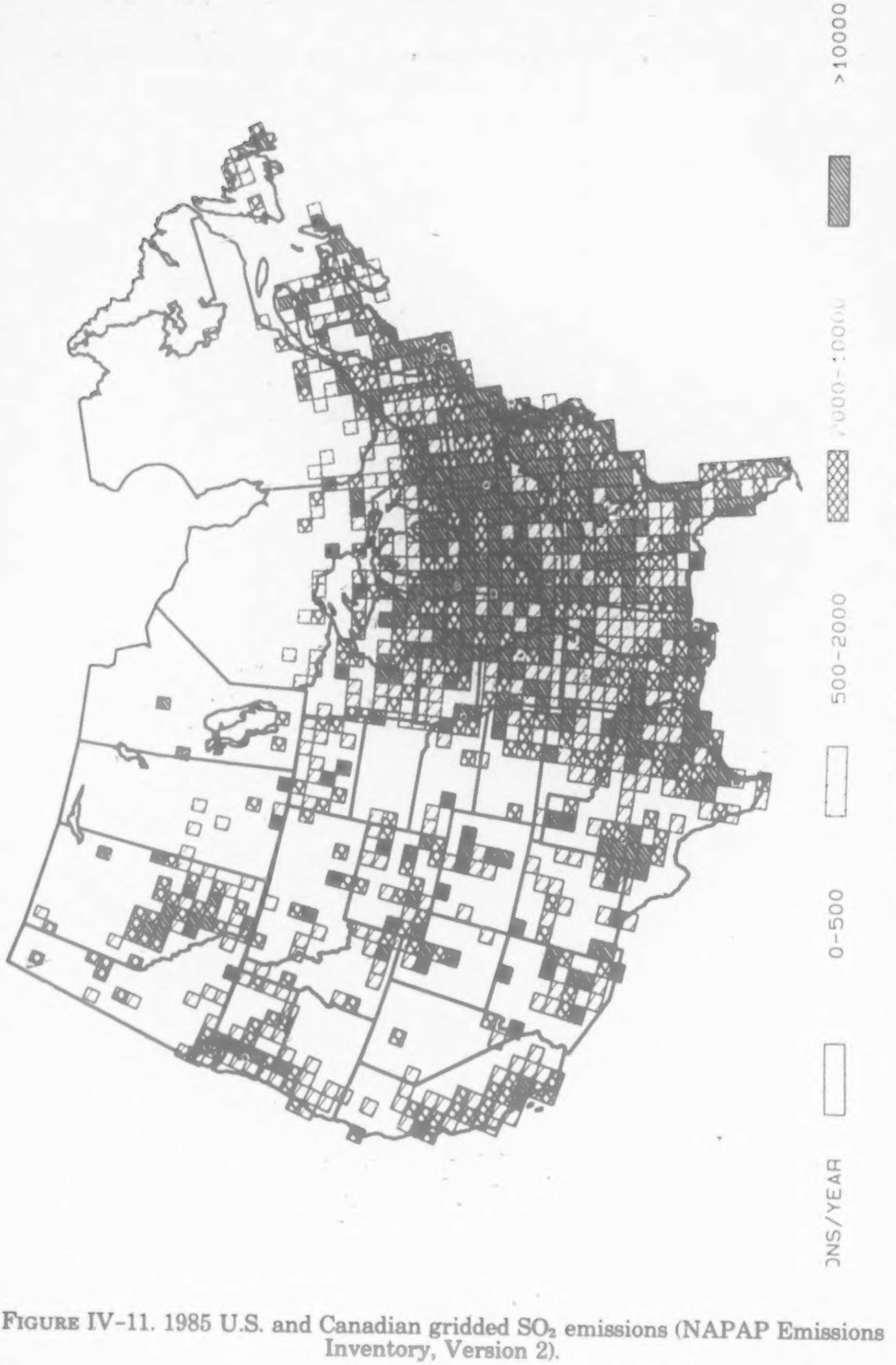

ONS/YEAR
0-500
500-2000
2000-10000
>10000
GRID SIZE IS 2/3° LATITUDE BY 1° LONGITUDE

FIGURE IV-11. 1985 U.S. and Canadian gridded SO_2 emissions (NAPAP Emissions Inventory, Version 2).

STATE	UTILITIES	INDUST. COMB.	INDUST. PROCESSES	TRANSPORT	OTHER PT SOURCE	OTHER AREA SOURCE	STATE TOTALS
Alabama	195	60	23	169	0	13	460
Arizona	75	41	2	122	1	7	248
Arkansas	49	40	9	131	0	8	238
California	48	167	58	903	7	63	1,245
Colorado	114	33	2	127	5	11	293
Connecticut	23	5	0	86	2	11	128
Delaware	30	10	3	24	0	2	68
Dist. of Col.	0	0	0	16	1	2	20
Florida	254	31	16	358	1	21	680
Georgia	232	47	17	270	1	20	588
Idaho	0	11	2	50	0	25	88
Illinois	431	104	44	341	6	43	969
Indiana	459	123	28	249	5	21	885
Iowa	80	26	7	142	2	11	267
Kansas	138	113	15	148	0	10	423
Kentucky	261	69	13	165	1	12	520
Louisiana	184	293	67	204	1	14	763
Maine	5	13	2	42	1	5	67
Maryland	68	20	11	166	3	14	282
Massachusetts	82	17	1	148	3	23	274
Michigan	245	82	12	274	5	38	656
Minnesota	126	22	7	180	3	17	354
Mississippi	40	48	13	127	1	8	237
Missiouri	254	26	24	214	1	17	536
Montana	25	11	9	91	0	19	155
Nebraska	35	9	1	114	0	6	165
Nevada	61	2	1	46	0	2	113
New Hampshire	22	3	0	26	0	3	55
New Jersey	63	23	18	219	4	29	356
New Mexico	107	97	3	71	0	6	283
New York	120	62	2	366	16	63	628
N. Carolina	192	48	10	232	2	17	501
N. Dakota	106	20	1	55	1	3	185
Ohio	489	89	21	372	9	37	1,017
Oklahoma	82	122	21	163	0	10	398
Oregon	2	15	3	136	0	15	169
Pennsylvannia	461	91	32	325	4	43	956
Rhode Island	2	2	0	23	0	3	30
S. Carolina	82	35	7	124	0	10	258
S. Dakota	16	3	1	47	0	6	73
Tennessee	198	51	26	217	2	14	508
Texas	516	906	259	788	9	33	2,512
Utah	53	33	12	64	2	7	171
Vermont	1	1	0	20	0	3	25
Virginia	76	54	19	223	2	15	390
Washington	38	25	13	166	3	29	274
West Virginia	317	46	20	68	0	6	457
Wisconsin	111	43	3	171	1	20	348
Wyoming	92	69	9	51	0	3	224
TOTALS	6,662	3,259	865	8,835	105	816	20,541

FIGURE IV-12. Anthropogenic NO_x emissions in 1985 (thousands of tons) by category by state (NAPAP Emissions Inventory, Version 2).

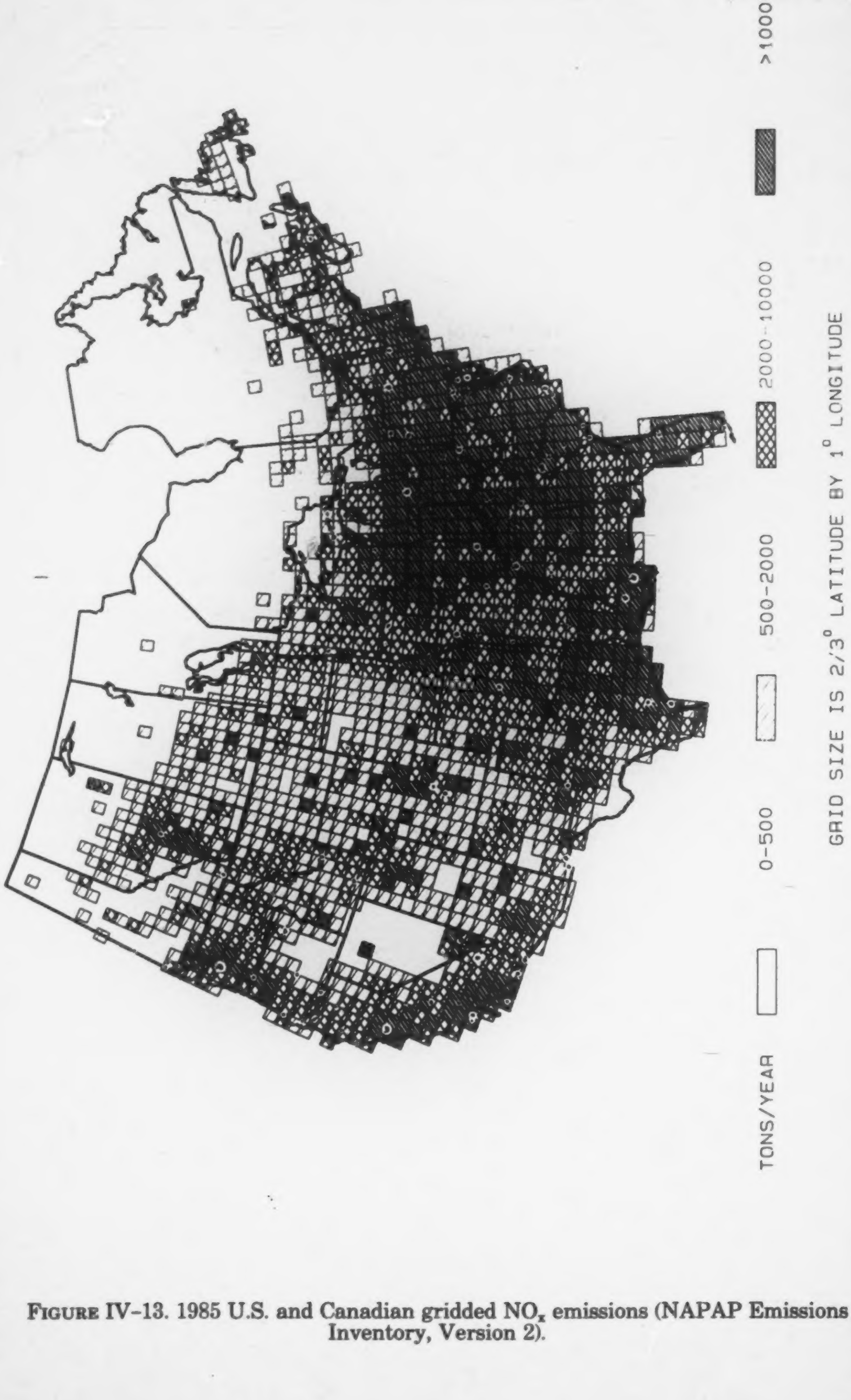

TONS/YEAR
0-500
500-2000
2000-10000
>10000
GRID SIZE IS 2/3° LATITUDE BY 1° LONGITUDE

FIGURE IV-13. 1985 U.S. and Canadian gridded NO_x emissions (NAPAP Emissions Inventory, Version 2).

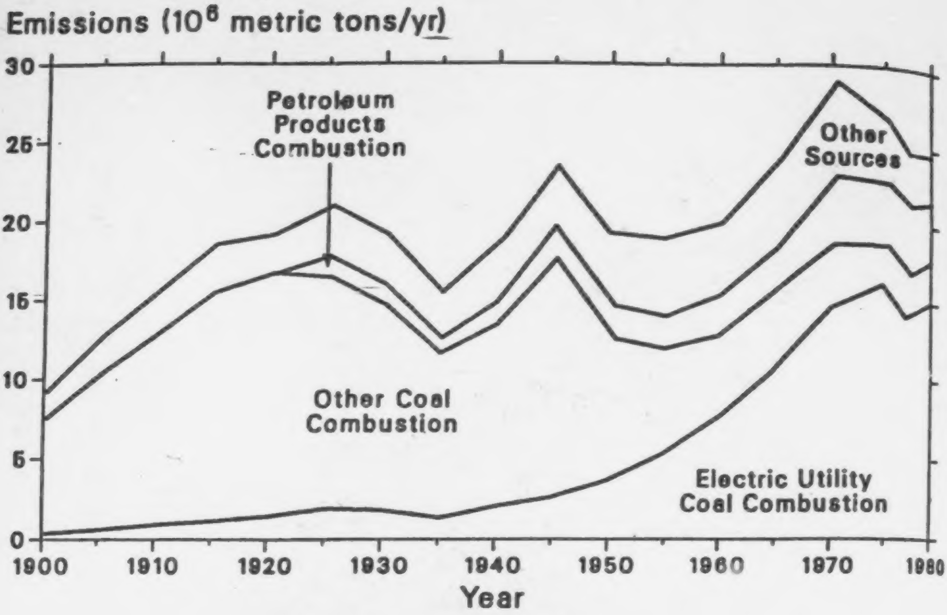


FIGURE IV-14. Historical trends in U.S. man-made SO_2 emissions by source category, 1900 to 1980 (Gschwandtner, et.al., 1985).

The shift from the use of coal in small, dispersed sources to its use in large power plants is significant to acidic deposition studies because it indicates that emissions released higher into the atmosphere and at higher flue-gas temperatures and exit velocities have become dominant over the last 25 years.

Need for measures beyond the current Clean Air Act.—The Act was written at a time when the inter-state transport of air pollution was not widely acknowledged. Indeed, it was the implementation of the Clean Air Act which created a substantial number of the interstate pollution problems. Rather than reducing their emissions of sulfur dioxide, electric utilities proposed the use of "tall stacks" to inject pollution into the upper atmosphere where it could be diluted and transported over long distances. Although illegal, this policy was expressly approved by the first Administrator of the Environmental Protection Agency, William D. Ruckelshaus, and quickly lead to the widespread use of super-tall smokestacks.

Although the Congress enacted curbs on the use of tall stacks in the 1977 amendments to the Clean Air Act, the regulations were not issued until 1987 and, even now, are tied up in litigation. In addition, the Congress enacted a new section 126 expressly to control interstate air pollution. But this too has largely failed to achieve the congressionally intended goal of curbing and controlling interstate air pollution. Thus, the law remains today largely what it was when written in 1970, keyed almost entirely to achieving local ambient air quality standards.

Some have suggested that the existing law is adequate to deal with interstate air pollution. The most persuasive argument that it is not, is the EPA's own analysis of the options available under existing law. This analysis was prepared by Agency staff in 1983 at the instruction of William D. Ruckelshaus, who at that time had just been reappointed to the post of Administrator. The following are excerpts from that analysis:

> EPA could take several regulatory and policy steps under the existing Clean Air Act to obtain both further information on the reductions in SO_2 and NO_2 (or total sulfur and total reacted nitrogen). Preliminary examination of these steps raises questions regarding the costs of control and administration, disruption or possible distortion of the current ambient air quality program, impacts on coal miners, equity, timing and effectiveness. However, some steps appear worthy of further evaluation, while others could serve to reinforce certain steps by helping to assure that their intended effects were fully realized in practice, as explained below.
>
> Several issues are raised by more intensive use of existing authority.
>
> First, existing authority (even for dealing with interstate impacts) is almost entirely keyed to achieving ambient air quality standards. Accordingly, tightening existing procedures (e.g. modeling) to effectively tighten emission limits, would likely be met with requests for SIP relaxations or other resistance based on assertions that tightening is not needed to meet the NAAQS. Further, emissions trading keyed to meeting NAAQS is constrained to small geographic areas (e.g. several miles or less for SO_2) relative to the statewide, interstate or interregional trading that would be consistent with a total loadings approach as envisioned by several acid rain bills in Congress. A larger trading area would allow more sources with greater variation in pollution reduction costs to trade, with greater savings potential.
>
> Second, tightening existing procedures may affect the flexibility and credibility of the current air program, since it will impose yet another reduction requirement in areas widely believed to have attained ambient standards. Such tightening will also require a shift from well debated policies and practices established over a number of years. It may also be difficult to tighten selectively. For example, tightening modeling procedures may eventually have to be applied to all areas of the country, all pollutants and/or all types of sources—without regard for their effect on total loadings or efficient administration.
>
> Third, any substantial reduction produced by more intensive use of existing authority may have significant effects on unemployment, as eastern powerplants shift from local high sulfur fuel to lower sulfur coal from western mines. EPA may be in a much less defensible position where those reductions are sought through creative use of existing authority, than where Congress clearly mandates reductions beyond those required to meet local ambient air quality concerns. For example, an unresolved section 125

> petition (to require use of only local coal) from the state of Ohio could impede any EPA efforts requiring a shift to lower sulfur coal.
>
> Finally, any use of existing authority should consider the sources affected to determine whether they might soon be revisited under new deposition authority in ways that would render compliance efforts obsolete.
>
> Despite these caveats, there are steps which appear preliminarily capable of securing significant additional reductions. To the extent, however, that these steps are perceived as disruptive departures from past air program management, many States and sources could be expected to resist their application resulting at the very least in substantial delays in making them effective.
>
> Within these limitations [EPA could] . . .
>
> Use Clean Air Act section 114 to require all existing powerplants which burn over 250 million Btu per hour to install continuous emission monitors to meet current emission limits . . .
>
> Require use of 24-hour averages for enforcement in Ohio and Indiana, instead of thirty day rolling averages . . .
>
> Use section 115 of the Clean Air Act, which is not limited to meeting the NAAQS, to require SIP tightenings for sources that "cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare in a foreign country" . . .
>
> Require stricter air quality modeling . . .
>
> Add a stringent 3 hour SO_2 compliance averaging time to Continuous Emission Monitoring
>
> Use New Source policies to encourage turnover of existing sources or to obtain further reductions through stricter technology determinations . . .
>
> Require extra reductions from existing source emission trades . . .
>
> Revise the ambient standards . . .

Within the context of curent law, some States choose to stringently regulate levels of air pollution solely to protect their environment. Others choose to do so in order to preserve room for future economic growth. In either event, to protect these legitimate State interests requires a regulatory program which recognizes and minimizes interstate transport of air pollutants, regardless of their identities.

Control Technologies.—Emissions of a wide variety of pollutants can be reduced sharply and economically with existing technologies and practices. Many other industrialized nations have already adopted these technologies while maintaining or improving their economic competitiveness.

Pollution can be reduced by—

(1) improving overall efficiency;
(2) changing or cleansing fuels;
(3) adopting alternative combustion technologies;
(4) installing flue gas cleansing devices; or,
(5) establishing end-use conservation programs.

These approaches can also be used in combination.

Precombustion Technologies.—Precombustion techniques attempt to reduce the amount of sulfur or nitrogen present in the fuel prior to combustion. This is done either through technological means or through selection of fuel naturally low in sulfur and nitrogen content. Precombustion techniques work well in combination with other technologies and require less plant modification.

One simple method of reducing SO_2 emissions is to substitute other fuels, such as oil or natural gas, or to use lower sulfur coal. Sulfur content among coals ranges from 0.3 percent sulfur to 6 percent sulfur. When burned, coal emits between 0.4 lbs per million btu (Lbs/mmBtu) and 12 lbs/mmBtu. Low sulfur coal is coal with a sulfur content below 1.0 percent suflur or coal which, when burned, emits less than 1.2 Lbs-mmBtu. Low sulfur coal is found both in the Eastern and Western United States, although Western coal is generally low sulfur and Eastern coal is more frequently of the high-sulfur variety.

Use of low-sulfur coal, also referred to as fuel switching, does not represent a complete strategy for substantial emission reductions. Because the largest amount of low-sulfur coal is located in the West, the cost of transporting large amounts of coal makes widespread fuel switching in the East impracticable. Large-scale fuel switching would also impact unfavorably on the eastern high-sulfur coal industry.

A slightly more technologically advanced presombustion technique is coal washing. Coal contains sulfur in two forms, pyritic sulfur and organic sulfur. Pyritic sulfur is the discrete mineral contained in coal and unlike organic sulfur, can be removed through physical separating processes. Thirty to seventy percent of the sulfur in coal may be in pyritic form. Coal washing can remove up to 40 percent of the pyritic sulfur in coal depending upon the original sulfur content of the coal. Coal washing is achieved through crushing the coal and then separating out the different particles based on their specific gravity in water.

Although washed coal has a higher Btu content, less sulfur and reduced ash, coal washing is most economical with high-sulfur coals and by itself is capable of achieving only moderate amounts of emission control. According to EPA, on a cost per ton basis, coal cleaning is only slightly more cost effective than wet scrubbing. Still, coal cleaning represents an intermediate control option and can be easily used in conjuction with other control technologies.

Methods for chemical coal cleaning which could remove the organic sulfur are still under development. These methods include, microwave desulfurization, hydrothermal desulfurization and electron beam cleaning. Although these technologies are still years away from the commercialization stage, they do represent promising precombustion alternatives. These techniques are expected to remove up to 90 percent of the total sulfur in coal.

Coal can be liquified or gasified. In addition to facilitating transportation, liquifaction and gasification can reduce sulfur content as well. Gasification can result in a 95 percent removal of sulfur. Liquifaction, in combination with other processes, can result in 70 percent to 90 percent removal of sulfur. Liquifaction is achieved through two process methods, "indirect" and "direct" hydrogenation. In indirect hydrogenation, coal is converted to gaseous carbon monoxide, hydrogen and methane and is then converted to a liquid through catalytic conversion. During direct hydrogenation, a solvent is used to liquify pulverized coal which is then processed into a fuel similar to oil, which is further refined through a process known as "cracking" to produce a variety of fuels. This process, also known as solvent refined coal, is effective on a variety of coals and results in removal of all pyritic sulfur and 65 percent to 70 percent of all organic sulfur. Both liquifaction and gasification can result in production of toxic substances during the processing.

Combustion technologies.—The current generation of power plants in the United States burn pulverized coal to create steam which powers a turbine to generate electricity. This technology dates back to the beginning of the century, and it has remained essentially unchanged for several decades. But since the oil shocks of the 1970's, new technologies have emerged which are or soon will be commercially available. Compared to conventional pulverized coal combustion, these technologies can reduce sulfur dioxide emissions by 95 percent, oxides of nitrogen emissions by 80 percent and, due to their improved efficiency, carbon dioxide emissions by 25 percent. Reductions in NO_x emitted by plants using several new technologies are illustrated in Figure IV–15.

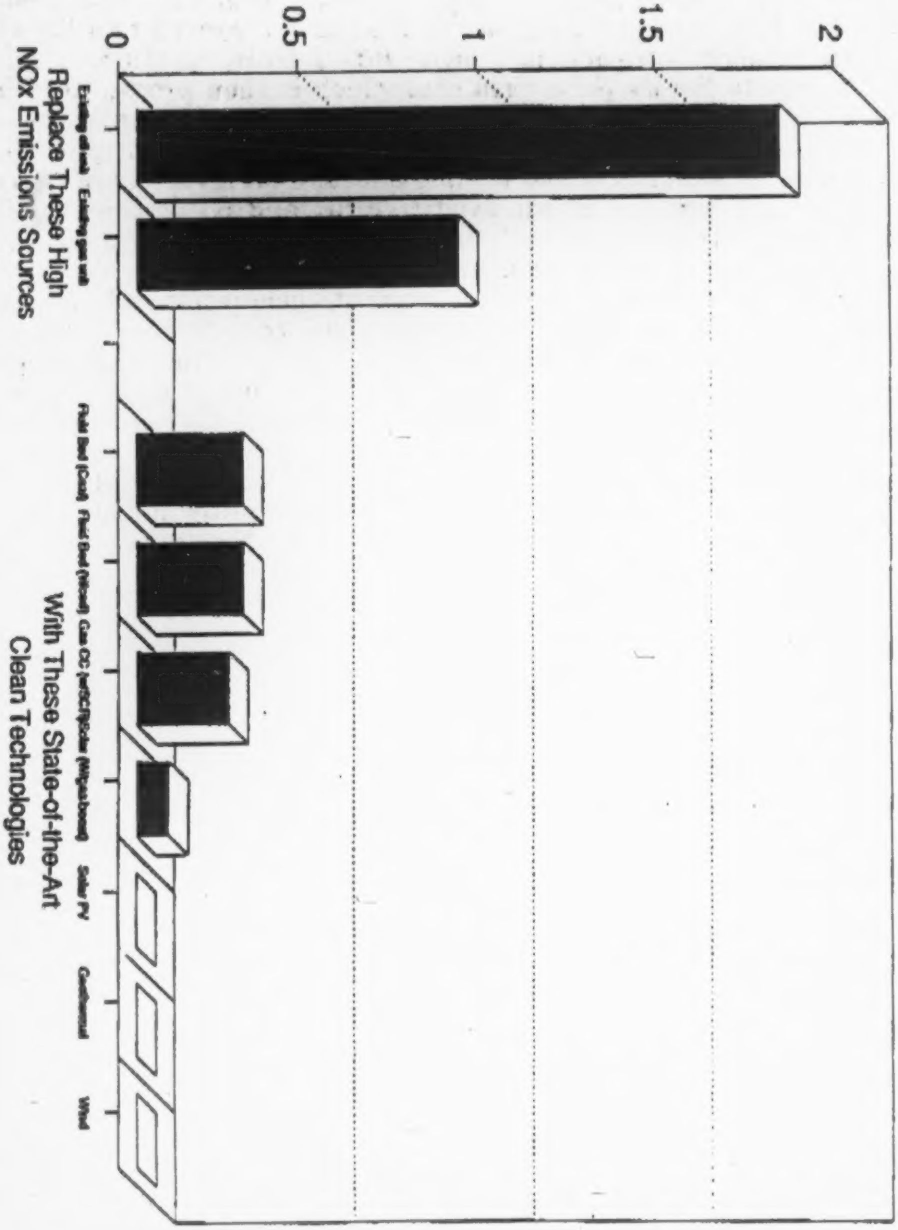


FIGURE IV-15. NO_x emissions (pounds per megawatt-hour) from plants using new combustion technologies (Independent Power Corporation).

Two of the more promising new combustion technologies are fluidized bed combustion and integrated gasification-combined cycle.

In fluidized bed combustion, enormous drafts of air are blown through a mixture of powdered coal (or other fuels) and materials such as limestone. During this process, the mixture is suspended in mid-air and behaves like a fluid. When this process takes place in a pressurized atmosphere, the system is known as pressurized fluidized bed combustion (PFBC). If the process takes place at normal atmospheric pressure, the system is referred to as atmospheric fluidized bed combustion (AFBC). Both types of fluidized bed combustion are intrinsically cleaner and more efficient than conventional technologies.

PFBC plants are now being built and soon will be operating commercially in the United States, Sweden, and Spain. The Spanish plant is notable for the extreme condition of its fuel, a black lignite with up to 8 percent sulfur, 20 percent moisture, and 40 percent ash. The PFBC retrofit is projected to increase plant efficiency from 29 to 35 percent. In addition, sulfur removal is projected at 90 percent, and NO_x emissions will be cut by 75 percent. The commercial scale plants scheduled to begin operation in 1990 incorporate features that were tested at a 15-megawatt facility operated for over 5,000 hours in Malmo, Sweden.

AFBC plants are capable of reducing SO_2 emissions by 90 percent and NO_x emissions by 50 percent. In the United States, AFBC plants are operated by the Tennessee Valley Authority and by Northern States Power. NSP's Black Dog facility is a retrofit of a coal-fired facility, which increased the plant capability by 40 megawatts and extended its life by 25 years.

The integrated gasification-combined cycle technology is often referred to as the "Cool Water" system, a name drawn from the location of its first commercial scale application at the former Cool Water Ranch near Dagget, California.

During a five year period in the early to mid-1980's, the Cool Water plant operated with a wide variety of domestic coals, achieving sulfur removal levels of 95 percent or more. The plant's efficiency in converting fuel to electricity, however, was only in the mid-30's. New versions in which the gases are superheated are being perfected by the Japanese and are projected to achieve 44 percent efficiency. The "hot gas" systems might achieve even higher efficiencies if they utilize newer advanced gas turbines now commercially available from manufacturers including General Electric and Siemens. One set of these turbines operated by Delmarva Power and Light has achieved a NO_x emission rate of 25 parts per million (approximately 0.05 pounds per million Btu).

In the application of another new technology, sorbent injection, limestone is injected directly into the furnace at the point of combustion. This process, currently in the development stage, will be capable of reducing of SO_2 emissions by 50 to 75 percent. The capital and operating costs of sorbent injection will range between $360 and $670 per ton of SO_2 removed, according to the Congressional Research Service.

An additional new technology now operating in several countries is the combined cycle system, which boosts efficiency by using one set of turbines fired by gases and another set fired by steam. One of the largest applications, the Futsu plant in Japan, uses General Electric turbines to achieve 47 percent fuel-to-electricity conversion efficiency. Were it built today, this 2,000 megawatt plant would probably achieve an efficiency of 52 percent due to improvements in materials and design.

Fuel cells are devices nearing commercial availability which convert fuel into electricity using chemical processes. A 4.5 megawatt unit has successfully operated in Japan and another 11 megawatt facility is under development. Fuel cells also operate on the 200 kilowatts scale achieving 40 percent efficiency with negligible NO_x emissions. The Tokyo Electric Power Company, which with 35 million customers is the world's largest commercial utility, plans to market these units commercially beginning in the mid-1990s. The leading fuel cell manufacturers are U.S. companies.

The current generation of fuel cells utilize phosphoric acid, but the next generation, relying on molten carbonate, is expected to reach 70 percent fuel-to-electricity conversion efficiency.

Another combustion technology, cogeneration, is the practice of using industrial process heat that would otherwise be wasted. In industrial facilities, the heat can be used to run other processes (e.g. in pulp and paper mills), while plants located near residential areas can use the waste energy to heat or cool homes, apartments, and stores. Using this heat can boost efficiency into the 85 to 90 percent range. Pollution is reduced accordingly.

Aircraft derivative turbines—a new technology using jet engines to generate electricity—can now achieve 40 percent efficiency but, according to analyses by the California Energy Commission, may have the potential to reach as high as 60 percent. These calculations must be validated, but they illustrate the potential to technologies expected to become available as demand increases.

The relative efficiencies of some of these technologies is summarized in the following chart:

Technology:	*Efficiency (percent)*
Current powerplants (average)	33
New coal-fired pulverized coal	38
PFBC	42–44
"Hot Gas" IGCC	42
Natural gas combined cycle (LHV)	52
Aircraft derivative turbines	50
Fuel cells (phosphoric acid)	40
Fuel cells (molten carbonate)	70
Cogeneration/district hearing	85–90

Postcombustion Technologies.—Postcombustion processes remove emissions from the smokestack before they are released into the atmosphere. Postcombustion processes are reliable and have been commercially demonstrated at thousands of plants throughout the world. Nearly 200 flue gas desulfurization units (FGD) are operating or soon to be operating in the United States.

FGD units, also known as scrubbers, work through the reaction of exhaust fumes with lime or limestone. "Wet" scrubbers spray limestone dissolved in water through the exhaust gases to convert the gases to calcium sulfite and calcium sulfate. Wet scrubbers can remove 90 to 95 percent of the SO_2 formed in combustion. These systems can be built and operated at a cost of $400 per ton of SO_2 removed, according to the Congressional Research Service. "Dry" scrubbers, which do not use water, can achieve a removal rate between 70 and 90 percent of the SO_2 formed during combustion.

Although early FGD units were expensive to install and operate, the cost of scrubbers has declined substantially. Figure IV–16 gives the actual operating costs of several recently installed FGD units.

Basis: Wet limestone FGD with forced oxidation and sludge fixation.

PEDCO Report (1)	
Dec. 1984 & Capital	$ 108.80/kW
First year operating	6.70 mills/kWh
PPSD Report	
Capital	$ 150.00/kW
First year operating	6.26 mills/kWh
Rubin Report (3)	
Capital	$ 237.00/kW
First year operating	10.40 mills/kWh
CH$_2$M Hill Report (4)	
Capital	$ 277.70/kW
First year operating	13.91 mills/kWh
EPRI Cost (5)	
Capital	$ 177.00/kW
First year operating	6.83 mills/kWh
EPRI Levelized* (5)	
Capital	$ 177.00/kW
First year operating	15.80 mills/kWh

* Levelized @ 12.5% interest, 8.5% inflation for 30 years; Factor = 2.31 applied to first year operating costs.

FIGURE IV-16. Capital and operating costs (in 1984 dollars) for full scrubbing on actual steam-electric units ("Retrofit of wet limestone FGD to coal-fired utility boilers," Flakt, Inc.).

Although the United States has lead the world in the development of some air pollution control technologies, other countries have more aggressively developed and implemented controls for oxides of nitrogen. Flue gas treatments for NO$_x$ control have been widely used in Japan. The most promising is Selective Catalytic Reduction (SCR), which uses ammonia to catalytically reduce NO$_x$ emissions by up to 90 percent. Although the original ammonia injection process for control of NO$_x$ was developed in the United States, the first applications were in Japan, beginning in 1974, because of the more stringent standards there.

The capital and levelized operating costs of SCR have declined steadily since the first systems were installed in the early 1970's. According to an EPA estimate using methodology from the Electric Power Research Institute, SCR equipment can be installed and operated today at a cost as low as $600 per ton of NO$_x$ emissions removed. Experience in several countries has demonstrated that these systems can operate reliably and economically in a wide range of conditions and facilities. Declining costs and increasing reliability have led to the widespread adoption of SCR, often in combination with low-NO_x burners, as the preferred means of controlling NO_x emissions. Indeed, the United States is one of the few industrialized nations which has failed to require the installation of SCR or comparably stringent emission limits for NO_x. Figures IV-17 and IV-18 illustrate the relative costs of SCR and its increasing use.

		(%) Levellized Busbar Cost	
	Project Cost	Case-1	Case-2
FGD System	10.5	14.3	11.5
SCR System	3.0	4.0	3.4
Combustion Mod.	0.6	0.8	0.6
Wastewater Treatment System	2.2	Included in FGD & SCR	
ESP System	3.1	2.7	1.9
Sub-Total	19.4	21.8	17.5
Main Plant	80.6	78.2	82.5
Total Plant	100	100	100

Note:	Life time	Pollution Control Plant	Main Plant
	Case-1	7 Years	20 Years
	Case-2	20 Years	20 Years

Figure IV-17. Standardized cost of air pollution control ("Air Pollution Control Technology in Canada and U.S.," Electric Power Development Company, Ltd.).

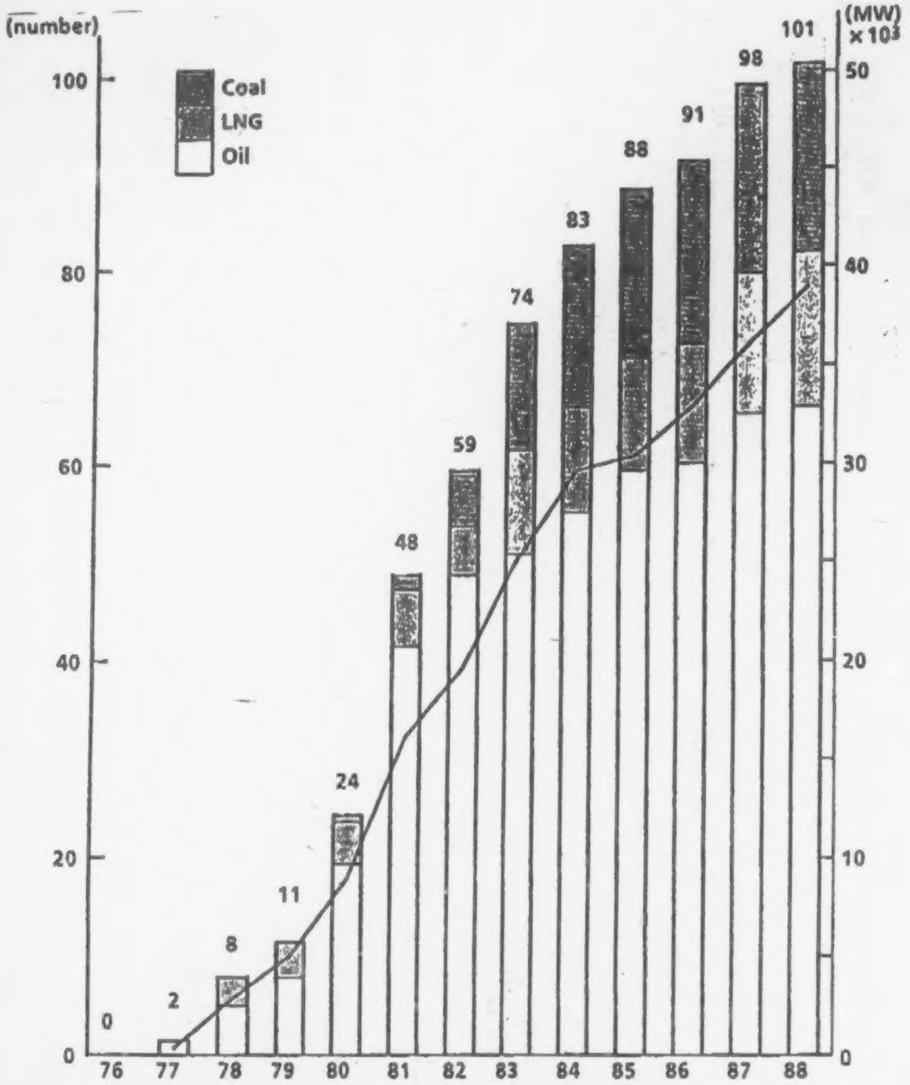


FIGURE IV-18. SCR facilities in Japan ("Environmental Issues in the Global Community," Ministry of International Trade and Industry, Government of Japan).

The major equipment required for an SCR system is a catalytic reactor. A typical SCR catalyst is composed of vanadium and tungsten oxides supported on a porous titanium dioxide carrier. The catalyst is usually in the form of a honeycomb.

SCR has been operating on Japanese utilities for 13 years in oil and gas-fired units and 7 years in coal-fired units. After the first few years with some start-up problems, these facilities have operated in a trouble-free manner and, in fact, some gas-fired boilers have been operating with their initial catalyst charge for more than 10 years. Development of SCR for coal-fired boilers began in the late 1970's and is reaching the same quality of operation in Japan today. Some coal units have operated satisfactorily for 6 years with their initial catalyst charge. Variable combustion streams for some coal make catalyst poisoning a problem for SCR application to coal.

To date, SCR has been applied to more than 100 units in Japan, with several commercial facilities and about 50 pilot plants installed in West Germany as well. SCR has also been used in Sweden and Austria. Widespread commercialization of SCR technology on powerplants in the U.S. is awaiting stricter NO_x emissions standards. Areas of California currently have stringent NO_x standards. Here, SCR technology is widely used commercially to reduce NO_x from industrial boilers, refinery heaters, stationary engines, and gas turbines. However, the scale of operations is typically considerably smaller that required by electric utilities.

Because of recent developments in technology, SCR catalysts have improved in efficiency and durability, thus improving the technology's economics. In addition, in areas where SCR technology has been widely adopted, competitive forces have lowered catalyst prices significantly.

Costs of inaction.—Acid rain is responsible for extensive damage to lakes and streams, forests, building materials, visibility, and human health. Many of these effects are difficult to quantify, but some efforts have been made to estimate the extent of acid rain-related damage. In 1987, the Environmental Protection Agency released a regulatory impact analysis on several proposed revisions to the national ambient air quality standard for sulfur dioxide. One proposal would have reduced U.S. emissions by 11 million tons per year, which is similar in result to title IV of S. 1630. The EPA study listed 44 categories of potential benefits that would result from this reduction in SO_2 emissions, and attempted to quantify the benefits in eight of those categories. As a result of this study, the agency determined that approximately $5.2 billion could be saved each year in avoided costs *to this partial list of categories alone.* Moreover, this figure is discounted to the year in which the proposed regulatory program would have taken effect. In present terms, damages caused by these additional emissions are about $9 billion per year.

The damages included in the EPA report are lost wages and medical bills due to non-fatal sulfate-related illness, materials damage to residential structures, and reduced visibility. The cost estimate does not consider the value of reducing human mortality risks from exposure to acidic aerosols, nor can it include the value of reduced pain and suffering to the victims. The cost of lake and stream acidification is also omitted from the report, as is the value of reducing materials damage to industrial, commercial, and institutional structures. In particular, damages to cultural property and destruction of irreplacable historical structures were deemed too difficult to quantify.

Countless reports of acid rain-related damage make clear that the country incurs real costs unless acid rain controls are implemented without delay.

ACID DEPOSITION CONTROL (SECTION 401)

SUMMARY

Introduction.—This title adds a new title IV to the Clean Air Act for the express purpose of reducing the emission, transport, transformation and depostition of acid rain precursors, sulfur dioxide and oxides of nitrogen, which have serious adverse effects on human health and the environment. The title, which applies to the 48 contiguous States of the United States, limits the emissions of sulfur dioxide ("SO_2") and oxides of nitrogen ("NO_x") from utility steam-electric plants.

The objective of the program established under this title is to reduce annual SO_2 emissions by 10 million tons below 1980 levels by the year 2000 and to reduce annual NO_x emissions by 2.7 million tons below projected year 2000 levels by the year 2000. Specifically, the title calls on electric utilities to reduce their annual SO_2 emissions by approximately 8.5 million tons from 1980 levels. EPA estimates that between 1980 and 1985, SO_2 emissions from non-utility sources decreased by between 1.0 and 1.5 million tons and projects that non-utility SO_2 emissions will remain at or below these reduced 1985 levels indefinitely. In addition, title II of the bill requires the desulfurization of diesel fuel, which will eliminate an additional 300,000 tons of annual SO_2 emissions. In sum, EPA estimates that 25.7 million tons of SO_2 were emitted in 1980. When fully implemented, this bill would require that total annual SO_2 emissions be no more than 15.7 million tons of SO_2. (Emissions inventories, emissions projections and cost estimates discussed herein were primarily supplied by the Environmental Protection Agency in testimony before Congress or in memoranda. These were based, in turn, on analyses provided by ICF Corporation, a private contractor, or on the National Utility Reference File).

The legislation makes those aggregate annual SO_2 reductions permanent by requiring new utility plants to secure emissions offsets from other SO_2 sources after January 1, 2000. The bill seeks to ensure that by the year 2000 aggregate annual SO_2 emissions from utility sources be fixed at no more than 8.9 million tons.

This title also requires utility plants to reduce their annual NO_x emissions by approximately 2.7 million tons from projected levels by 2000. Taken in conjunction, the provisions of this legislation will yield approximately 2.0 million tons of annual NO_x reductions as compared to 1980 levels, according to EPA estimates.

The sulfur dioxide reduction program established under this title operates in two Phases. Beginning January 1, 1995, approximately 100 high-emitting utility units will be required to make reductions in their total annual emissions to reach emissions levels no greater than the product of 2.5 lbs./mmBtu multiplied by baseline fuel consumption. Beginning January 1, 2000, all utility units emitting SO_2 at rates equal to, or greater than, 1.20 lbs./mmBtu and with nameplate generating capacity equal to, or greater than, 75 megawatts will be required to reduce their total emissions to levels no greater than the product of 1.20 lbs./mmBtu multiplied by baseline fuel consumption. Other units will be permitted to increase their current emissions up to a prescribed level.

The NO_x reduction program becomes effective January 1, 2000, with reduction obligations determined according to boiler type. To ensure compliance, the title requires all affected units to install and operate continuous emissions monitoring systems and to report the results. The new title imposes severe and automatic financial and emissions offset requirements on units that fail to meet their emissions limitations.

Finally, through a system of marketable allowances, the reduction programs established by the title maximize the range of choices sources have for complying with their emissions limitation requirements. An individual source may emit more than required if another source emits less than it, the latter, is permitted to emit. Through this flexibility, the bill minimizes costs and maximizes flexibility and efficiency. EPA estimates that this added flexibility could reduce the total costs of the program by at least 20 percent.

On a regional basis, this may allow areas with substantial reduction obligations and total costs to lower their net costs by producing and selling "extra" reductions (*i.e.*, reductions beyond those they are required to achieve) to sources seeking to emit more than is permitted. At the same time, areas facing growth in the energy demand or units with high emissions control cost on a perton basis find that purchasing excess emissions reductions from plants in other areas, rather than making on-site reductions, enables them to comply with their emissions limitations at a significantly lower cost.

Allowing sources to market "extra" emissions reductions should also yield important environmental benefits as sources will have strong incentives to make greater-than-required reductions earlier than required. Since sources will enjoy maximum flexibility in responding to those incentives, this approach should also stimulate innovation in pollution-control technology and practices.

Findings and Purposes.—New section 401 states the findings upon which title IV is based and the overall purposes of the program established under title IV.

Definitions.—New section 402 defines certain terms used in the various new sections in title IV.

Allowance Program for Existing and New Units.—New section 403 of the Clean Air Act provides that existing units subject to emissions limitations will receive allowances equal to the amount of sulfur dioxide and oxides of nitrogen they will be permitted to emit under the emissions limitation program established by this title.

Since allowances will be, in effect, authorizations to emit SO_2 or NO_x, to be in compliance, a unit's emissions must not exceed its allowances. At the same time, allowances will be transferrable between units within two broad geographical regions. As a result, units will have the opportunity to reallocate among themselves their total emissions reduction obligations in the most efficient and cost-effective way possible. Section 403 lays out the basic design of the allowance allocation and transfer system.

New subsection 403(a)(1) directs the Administrator to allocate annual allowances to the owner or operator of each affected unit under this title. An affected unit is a unit that has a tonnage-based emissions limitation obligation or opts to make emissions reductions voluntarily. The number of allowances allocated for each unit shall be equal to the number of tons each unit is permitted to emit as calculated pursuant to new sections 404, 405, 406, 407, 409 and 410, which impose specific emissions limitations. The Administrator shall make the allowance allocation for each unit in conjunction with the issuance of its permit pursuant to new section 408.

The Administrator shall continue to issue allowances to affected units that have been removed from commercial operation.

New section 403(a)(2) of the Act establishes a "set-aside" or reserve of allowances that the Administrator may, upon receipt of payment, distribute to new, as opposed to existing, units under certain circumstances. Subparagraph (A) instructs the Administrator to issue to each affected unit 98 percent of the total number of allowances allocated to the unit in accordance with paragraph (1). The Administrator must deposit the remaining allowances, which are not issued, in a reserve under the Administrator's control.

Subparagraph (B) authorizes the Administrator to sell the allowances in the reserve to the owners and operators of new units which, pursuant to new section 403(e) of the Act, must hold allowances in an amount equal to the amount of SO_2 they emit each year. Since new units are not eligible for the allocation and issuance of allowances under paragraph (1), they must obtain them either from units that receive allowances under paragraphs (1) and (2)(A) or from the Administrator in accordance with the regulations promulgated pursuant to this paragraph.

The Administrator is required to promulgate such regulations no later than 36 months after the enactment of the bill. Such regulations are to establish the Administrator as a provider of allowances only as a last resort for those owners and operators of new units, which must comply with the requirements of subsection (e), when the owners and operators fully demonstrate that, after making substantial, good faith efforts, they have failed to obtain the necessary allowances from other allowance-holders.

The Administrator is also required to promulgate regulations that apply to existing units subject to the requirements of new section 405(h) of the Act. After January 1, 2000, section 405(h) prohibits each existing oil and gas-fired unit which, on an annual basis, consumes more than 90 percent of its fuel in the form of natural gas, from operating at an SO_2 emissions rate greater than each unit's actual 1985 rate. Section 405(h) provides that units facing curtailments in natural gas supplies may avoid a violation of their emissions limitation requirements if they apply to the Administrator to obtain allowances equal in number to the difference between a unit's 1985 emissions rate multiplied by its baseline, and its actual emissions for the year during which the curtailment occurs.

The Administrator may promulgate regulations authorizing the issuance of allowances from the Administrator's reserve to the owners or operators of units subject to 405(h) in circumstances in which the issuance of such allowances is necessary in order to protect the bargaining ability of owners and operators seeking to acquire supplies of fuel for their 405(h) units.

The Administrator has no authority to allocate or issue allowances apart from the authority specified in subsection (a) and may issue no greater number of allowances than provided for under paragraph (1).

Subparagraph (C) authorizes the Administrator to allocate allowances in an appropriate amount, determined as a result of a demonstration of the number of allowances needed for the unit, to each new unit owner or operator which meets the requirements of the regulations promulgated pursuant to subparagraph (B). The Administrator shall issue the allowances at a price of $1,500 per ton. The Administrator shall make annual adjustments to the $1,500/ton price specified for allowances issued pursuant to this subsection in order to account for inflation.

Subparagraph (D) requires the Administrator to redistribute, on a *pro rata* basis, to the owners or operators of the units from which the Administrator's reserve allowances were initially withheld, any moneys collected or allowances not issued. This re-distribution shall occur at the end of each Phase or five-year permit period as established under section 408 of the Act.

New section 403(b) of the Act requires the Administrator to promulgate, not later than 18 months after the enactment of the bill, comprehensive regulations for the transfer and management of the allowances allocated and issued under subsection (a). Allowances may be transferred between and among the owners and operators of units that receive allowances under the title and any other persons who lawfully acquire such allowances. Allowances not used in the year for which they were issued may be saved and carried forward to be added to allowances issued in subsequent years, but they may not be used in any year prior to the year for which they were issued. The regulations shall establish the division of the 48 contiguous States and the District of Columbia into two geographically defined regions within which allowances may be transferred. Allowances transferred between the owners and operators of units that receive allowances or others who lawfully hold allowances under this title may only be transferred to units within the region in which the unit for which the allowances were originally issued is located.

The subsection also makes it clear that the regulations can in no way undermine the reduction requirements of the title or in any way abet non-compliance by any unit subject to the requirements. Similarly, the subsection prohibits the Administrator from promulgating regulations that lessen the Administrator's or permitting authority's obligations to issue permits to sources that meet the permitting requirements, or to maintain vigorous monitoring and enforcement efforts. The subsection stipulates that, to be effective, transfers of allowances must be recorded by the Administrator following written certification by the parties to the transfer.

New section 403(c) of the Act allows sources to exchange allowances for NO_x emissions for those for SO_2 emissions and to apply allowances for one pollutant to emissions of the other. The rate of exchange shall be: 1.5 units of NO_x equals 1 unit of SO_2. SO_2 and NO_x trades involving sources in areas in nonattainment for ozone shall be subject to review and approval by the Administrator.

Subsection (d) requires the Administrator to establish, not later than 18 months after enactment of the bill, a system to ensure the Administrator's ability to issue, track, and record transfers of, allowances. While the allowance system is designed to facilitate compliance with the reduction requirements of this title, the Administrator is obligated to ensure that sources do not exploit or abuse the allowance system for purposes of avoiding compliance and frustrating the emissions reduction requirements of the title. At the same time, in keeping with the objective of maximizing choice and flexibility, allowance transfers and acquisitions automatically become part of the parties' respective permits once the transfers are recorded by the Administrator.

New section 403(e) of the Act requires all new utility units to hold allowances equal to the amount of their annual sulfur dioxide emissions. Since these units will not receive allowances from the Administrator under subsection (a)(1), this provision requires emissions from new units to be offset by emissions reduced or avoided at other sources. New units may meet their obligations under this subsection by acquiring allowances from any source or person lawfully holding allowance.

New section 403(f) of the Act circumscribes the legal status of allowances. The subsection specifies that allowances are a limited authorization to emit sulfur dioxide or oxides of nitrogen. Allowances may be limited, revoked or otherwise modified under the authority of the program or another authority of the Administrator. An allowance does not constitute a property right in absolute legal terms.

New section 403(g) of the Act prohibits any person from holding or transferring allowances other than in accordance with the regulations promulgated by the Administrator under this section.

Phase One Sulfur Dioxide Requirements.—New section 404 establishes Phase I of the sulfur dioxide emissions reduction program under new title IV. Subsection (a) specifies that each source that includes one or more units listed on Table A of the bill shall become an affected source beginning on January 1, 1995. Table A of the bill lists each unit that shall become an affected unit on that date. In general, affected units and sources are those with emissions limitation obligations, monitoring and reporting requirements, permitting requirements, allowance allocations, excess emissions liabilities, and other mandates specified in this new title. Subsection (a) also contains a default or statutory "hammer" provision making clear that as a matter of law, notwithstanding any other provision in this title, beginning on January 1, 1995, each unit listed in Table A must meet the tonnage limitations, expressed as a number of allowances, specified for that unit in Phase I. Unless the owner or operator holds allowances equal in amount to the unit's emissions, the owner or operator of any unit listed in Table A of the bill that fails to comply with the tonnage limitation specified for that unit in Table A of the bill shall be liable for fulfilling the obligations stipulated in new section 411 of the Act. Such an owner or operator shall also be subject to any other liabilities imposed on those who violate requirements of the Act.

Subsection (b) provides that the owner or operator of any unit listed on Table A of the bill may reassign all of, or part of, the emissions reduction obligations set out for the listed unit for Phase I in this new section to another unit or other units under the owner or operator's control.

To comply with this subsection, an owner or operator must designate those non-listed units to which the owner or operator wished to assign any, or all, of the listed unit's Phase I reduction requirements. In addition, the owner or operator must also submit to the Administrator the listed unit's baseline, its acutal 1985 sulfur dioxide emissions rate and the annual Emissions tonnage limitation specified for the unit in Table A of the bill. This submission must also include a calculation of the 1985 annual sulfur dioxide emissions tonnage for the unit or units to which the owner or operator wishes to reassign the listed unit's Phase I reduction obligations by multiplying each assignee unit's baseline by the unit's actual 1985 SO_2 emissions rate. The owner or operator's reassignment plan must then state the emissions rate at which both the listed unit and the assignee or substitute units will operate and the actual tonnage limitations which both the listed unit and the assignee or substitute units will meet. Finally, the owner or operator's reassignment or substitution proposal must demonstrate fully and conclusively that the emissions reductions resulting from the reassignment of the listed unit's reduction obligations will be equal to, or greater than, those the listed unit is required to achieve under subsection (a).

Not later that six months after receiving such a proposal to reassign emission reductions obligations under subsection (b), the Administrator, pursuant to subsection (c), shall determine whether or not the proposal meets the requirements of subsection (b). If it does not, then the Administrator shall disapprove the proposal. An owner or operator or a unit listed in Table A of the bill may not substitute, or reassign a listed unit's reduction obligations to, another unit without submitting a proposal in accordance with subsection (b) and without the express approval of the Administrator.

Paragraph (2) of subsection (c) stipulates that any unit (and source that includes the unit) to which a listed unit's reduction requirements are assigned under a substitution or reassignment proposal that is approved by the Administrator shall become an affected unit under new title IV of the Act and shall be subject to the permitting provisions of section 408 as well as to all other requirements for affected sources. The substitute or assignee unit shall be subject to the emissions tonnage limitation provided in the owner's or operator's proposal as approved by the Administrator and the Administrator shall, pursuant to new section 403 of the Act, allocate and issue allowance to the unit accordingly. Paragraph (2) also prohibits any unit that becomes an affected unit under this subsection from emitting sulfur dioxide in an annual amount that exceeds the number of allowances it holds. The owner or operator of any unit that violates this prohibition shall be liable under new section 411 and any other applicable provisions of the Act.

In the case of a reassignment or substitution proposal that has been disapproved by the Administrator, the Administrator shall simply issue allowances to the listed affected unit in accordance with subsection (a).

Phase II Sulfur Dioxide Requirements.—New section 405 of the Act defines the sulfur dioxide emissions limitations requirements of virtually every utility unit in the 48 contiguous States beginning January 1, 2000. As a result of this new section and new section

403(e) (the new unit offset requirement), new title IV will result in an aggregate annual SO_2 utility unit emissions limit of approximately 8.9 million tons. To achieve this, new section 405 requires units emitting SO_2 at a rate that was greater than 1.20 lbs./mmBtu in 1985 to achieve aggregate annual reductions of between 8.1 million and 8.6 million tons as compared to 1980 levels. The section permits units with nameplate generating capacity below 75 megawatts (MWe) or with 1985 SO_2 emissions rates below 1.20 to increase their emissions by approximately 20 percent, but limits them to that increased level. Together with emissions reductions that have already occured at industrial sources and other provisions of this legislation mandating the desulfurization of diesel fuel, these provisions should result in a reduction of approximatley 10 million tons of annual SO_2 emissions as compared to 1980 levels.

New section 405(a) of the Act specifies that beginning January 1, 2000, each utility unit identified in this section shall be subject to the emissions limitations specified for such unit and shall be an affected unit for the purposes of new title IV, including, but not limited to, the title's allowance, permitting and express emissions provisions. The owner or operator of any unit that does not comply with its emissions limitations shall be liable for fulfilling the obligations set forth in new section 411 of the Act.

Subsections (b) through (h) specify the emissions limitations for each of several categories of units. Each subsection includes a default or statutory "hammer" provision making clear that as a matter of law, notwithstanding any other provision of this title, beginning on January 1, 2000, each unit identified in these subsections must meet the emissions limitations specified in the subsection unless the owner or operator holds allowances equal in amount to the unit's emissions. Owners or operators of units which fail to comply with this requirement shall be subject to liabilities imposed on those who violate the Clean Air Act, in addition to those provided in new section 411 of the Act

Beginning January 1, 2000, new section 405(b) requires each existing steam-electric unit with a nameplate generating capacity equal tc, or greater than, 75 MWe and an actual 1985 SO_2 emissions rate equal to, or greater than, 1.20 lbs./mmBtu to limit its total annual emissions to a tonnage amount that is no greater than the product of the unit's baseline and an emissions rate of 1.20 lbs./mmBtu, divided by 2000.

New section 402(d)(1) of the Act defines "baseline" for units in commercial operation prior to January 1, 1985 as the annual average quantity of mmBtu's consumed in fuel during calendar years 1985, 1986 and 1987, as recorded by the Department of Energy pursuant to Form 767. The definition permits the Administrator, in calculating the baseline, to exclude periods during which a unit was shut down for a continuous period of four months or more. In applying this provision the Administrator should exercise discretion in choosing whether to include or exclude such periods so as to reflect the unit's normal operation. Thus, if a unit is used normally as a "peaking" unit, operated only for limited periods of time during each calendar year, the Administrator should calculate the unit's baseline accordingly. If a unit is normally used as a "baseload" unit, then the Administrator should exclude from the calculation of the unit's average annual fuel use any continuous period of time of four months or more during which the unit was unable to operate.

Subsection (b) allows the owner or operator of a unit whose emissions rate has decreased by 40 percent or more since 1980 and whose utility system's residential customer growth has increased by at least 3 percent since 1980 to choose any consecutive three-year period between 1980 and 1989 for the calculation of its baseline.

Subsection (c) applies to coal- or oil-fired utility units with nameplate generating capacity below 75 MWe and an actual 1985 emissions rate equal to, or greater than, 1.20 lbs./mmBtu. Beginning January 1, 2000, these units must limit their emissions by operating at an emissions rate no greater than that at which they operated in 1985.

Under subsection (d), beginning January 1, 2000, each coal-fired unit whose actual 1985 emissions rate was below 1.20 lbs./mmBtu must limit its annual SO_2 emissions to a tonnage amount no greater than the product of its baseline multiplied by a numerical factor of 120 percent and its actual 1985 emissions rate, divided by 2000. Subsection (d) also allows an oil- or gas-fired unit that has been awarded a clean coal technology demonstration grant by the Department of Energy as of January 1, 1991 to choose any consecutive three-year period between 1980 and 1989 in calculating its baseline for the purposes of subsection (d).

Beginning January 1, 2000, subsection (e) requires each oil- and gas-fired unit whose actual 1985 SO_2 emissions rate was equal to, or greater than, 0.4 lbs./mmBtu and less than 1.20 lbs./mmBtu to limit its annual emissions to a tonnage amount no greater than the product of its baseline multiplied by a numerical factor of 120 percent and its actual 1985 emissions rate, divided by 2000.

For each oil- and gas-fired unit whose actual 1985 emissions rate was less than 0.4 lbs./mmBtu and 90 percent or less of whose annual fuel consumption in Btu is in the form of natural gas, subsection (f) requires that beginning January 1, 2000, it must limit its SO_2 emissions to a tonnage amount no greater than the product of its baseline multiplied by a numerical factor of 120 percent and its federally approved emissions limitation divided by 2000.

Under subsection (g) a unit that commences operation between January 1, 1989 and the date of enactment of the Clean Air Act Amendments of 1989 must, beginning January 1, 2000, limit its annual SO_2 emissions to a tonnage amount no greater than the product of its annual average fuel consumption on a Btu basis when operating at a 65 percent capacity factor and the emission rate specified in its permit or another, superseding federally enforceable emissions limit, divided by 2000.

Finally, subsection (h) applies to, oil- and gas-fired units whose actual 1985 emissions rate was less than 0.4 lbs./mmBtu and more than 90 percent of whose annual fuel consumption in Btu is in the form of natural gas. The subsection requires each such unit to operate at an emissions rate no greater than its 1985 emissions rate beginning January 1, 2000. The subsection also provides that in any year in which the unit suffers a curtailment in the supply of natural gas, the owner or operator may apply to the Administrator, under section 403(a)(2) for allowances equal to the difference between the unit's actual 1985 emissions rate multiplied by its baseline (divided by 2000) and its actual emissions during the year including the period of curtailment.

Credits for Clean States.—New section 406 eases the emissions limitations requirements for existing units in a small number of States whose utilities have already made substantial investments in emission control technology.

New section 406(a) defines such States as those whose utility units emitted less than 150,000 tons of SO_2 in 1985 and more than 50 percent of whose coal-fired utility-generated electricity was produced in 1988 from boilers operating with continuous emissions control technology. Existing units in these States are not subject to the emissions reduction requirements of new sections 404 and 405.

After January 1, 2000, subsection (b) of new section 406 requires existing units in these States to limit their emissions to a level equal to their average annual emissions in 1996, 1997 and 1998. The owner or operator of any unit that violates this requirement shall be subject to new section 411.

Nitrogen Oxides Emission Reduction Program.—New section 407 requires existing utility to meet emissions limitations for oxides of nitrogen. Such limitations will be defined in terms of annual tonnage and unit owners and operators will be issued annual allowances equal to each unit's annual tonnage limitation.

Subsection (a) specifies that all units that are subject to the emissions limitation requirements of new sections 404 or 405 are also subject to the requirements of this section. Each such unit is an affected unit for the purposes of new section 407 of the Act and is subject to the allowance, permitting, monitoring, excess emissions, and other provisions of this title.

New section 407(b) of the Act explicitly imposes on each unit the legal obligation to meet the emissions limitation requirements set forth in this section beginning January 1, 2000. Such units may meet these requirements either by achieving the specified emissions levels or by obtaining allowances equal in amount to its annual emissions. The subsection specifies that for tangentially fired boilers annual NO_x emissions may not exceed in tonnage amount the product of each unit's baseline and 0.45 lbs./mmBtu. For dry bottom wall-fired boilers, each unit must meet an emissions tonnage limit equal to its baseline multiplied by 0.50 lbs./mmBtu.

For all other boilers, including but not limited to, cyclone, wet bottom and stoker boilers, each unit must meet a limit that is equal to the product of its baseline and its actual annual average emission rate in 1995 and 1996 as recorded for the unit by a system of continuous emissions monitoring (CEMS), whose installation and operation is required by new section 412 of the Act. For these units, the Administrator may specify a lower emissions rate if the Administrator determines that nonrepresentative operating conditions have resulted in the elevated emissions rates.

Subsection (c) requires the Administrator to propose, not later than January 1, 1993, and to promulgate, not later than January 1, 1994, revised new source performance standards for NO_x emissions from fossil fuel steam generating units, utility and non-utility, pursuant to section 111 of the Act. The subsection specifically mandates that such revised standards shall reflect improvements in methods for the reduction of NO_x emissions. Similarly, the subsection also requires the Administrator, following the same schedule, to propose and promulgate performance standards, pursuant to section 111 of the Act, for emissions of NO_x from large stationary diesel and turbine engines.

Permits and Compliance Plans.—New section 408 of the Act provides that sources subject to the requirements of this title be required to submit a compliance plan indicating how each will comply with such requirements and to obtain permits to operate. This section builds on the permit requirements contained in title V of the bill establishing a Federal operating permit requirement under the Clean Air Act.

Subsection (a) states that any permit issued to the owner or operator of an affected unit must prohibit each of the following:

(1) annual emissions of SO_2 or NO_x from exceeding the total allowances held by an affected unit or source,
(2) any exceedance of the applicable emissions rate, and
(3) any other provisions of the permit.

Subsection (b) provides that each permit application must be accompanied by a compliance plan for the source to comply with the requirements of this title. The plan should specify how the source will comply with the requirements of this title, an implementation schedule and whether the owner or operator intends to obtain additional allowances beyond the initial allocation in order to comply with the provisions of this title. Notwithstanding a statement, in such a plan, of an intent to acquire allowances, a plan must state the owner's or operator's commitment to achieve the emissions limitations required for each unit in all circumstances. In addition, the Administrator may require a demonstration of attainment of the national ambient air quality standards and an integrated compliance plan for owners or operators of two or more affected sources.

New section 408(c) of the Act addresses Phase I permits. This subsection requires that the owner or operator of each affected source submit a permit application and compliance plan not later than 30 months after enactment of the bill. The permit application and compliance plan are binding on the owner or operator until a permit is issued. The owner or operator may amend the permit application and compliance plan before the permit is issued by notifying the Administrator of such amendment.

New section 408(c)(1)(B) applies in cases in which owners or operators of Phase I units intend to make emissions reductions at those units by reducing their utilization. If the owner or operator of a Phase I unit intends to reduce the utilization of the unit by 20 percent or more compared with its baseline or by shutting the unit down, the compliance plan must specify the units that will provide the electrical generation necessary to compensate for the resulting reduced output. Any such specified unit that is not itself a Phase I unit shall be deemed affected under new section 404 and shall receive allowances equal to the product of its baseline and its actual 1985 emissions rate, divided by 2000. Alternatively, the compliance plan may simply demonstrate that the reduced utilization of the original Phase I unit will be accomplished by energy conservation or increased efficiency in the operation of the unit.

Subparagraph (2) requires the Administrator to review each compliance plan and approve or disapprove a complete submission within 6 months of receipt.

Subparagraph (3) requires EPA to promulgate regulations regarding permits for affected sources under this title not later than 18 months after date of enactment of the bill.

Subsection (d) addresses Phase II permits and the allowance system for clean States under section 406 and NO_x controls under new section 407. Units subject to the requirements of these sections cannot operate after January 1, 2000, unless they have allowances equal to the amount of their emissions of SO_2 and NO_x.

Sources subject to new section 405 (Phase II of the SO_2 reduction program) must submit permit applications not later than January 1, 1994. States with approved permit programs under title V of the legislation shall issue permits to owners or operators of existing affected units under new section 405 that satisfy the requirements of this Act by July 1, 1995. For States without approved permit programs, the Administrator shall issue permits to qualifying units not later than July 1, 1996. In conjunction with the issuances of its permit, the Administrator shall issue allowances to each affected source each year.

Sources subject to the NO_x control provisions of new section 407 shall submit permit applications by January 1, 1997, and the Administrator shall issue a permit for such qualifying sources not later than July 1, 1998, if such sources have not yet received State permits under an approved State program.

Sources subject to the clean States provisions contained in new section 406 shall submit permit applications not later than July 1, 1999, and the permitting authority shall issue a permit to qualifying sources.

Subsection (f) provides that new units must submit permit applications and compliance plans to the permitting authority not later than twenty-four months prior to January 1, 2000, or commencement of operation of the unit, whichever is later. Permits in compliance with the provisions of the Act shall be issued by the permitting authority.

Sources submitting permit applications and compliance plans may amend such applications and plans under subsection (g). Subsection (h) provides that it shall be unlawful for an owner or operator to fail to submit a permit application or compliance plan in accordance with the deadlines provided or to operate any source or unit subject to this title except in compliance with the terms and requirements of the permit application and compliance plan or permit issued by the permitting authority.

Repowered sources.—New section 409 of the Clean Air Act extends the compliance deadline for units with reduction obligation in Phase II from January 1, 2000, to December 31, 2004, if their owners or operators demonstrate fully that they will achieve the required reductions by repowering such units with qualifying clean coal technology. Such an extension is intended to accommodate the full development and commercialization of certain new or still-developing clean coal technologies as well as any additional time that may be required for their installation.

Owners or operators must demonstrate their commitment to use clean coal repowering technologies by December 31, 1997, and must include documentation of a preliminary design and engineering effort along with an executed contract for the repowering equipment. Any unit granted an extension under this new section shall not be eligible for a waiver under section 111(j) of the Clean Air Act.

To cover the period of extension, each qualifying unit will be issed non-transferrable allowances equal to the product of its baseline multiplied by the lesser of its federally approved State implementation limitation or actual emissions rate for 1995. At the time the unit is removed from operation for the purpose of installing the repowering technology, the unit shall be subject to the emissions limitations of new section 405 and the Administrator shall issue transferrable allowances for the unit accordingly.

Election for Additional Sources.—New section 410 of the Act provides existing units and industrial and process sources that are not eligible for an allocation of allowances under new section 403 with an opportunity to receive allowances in an amount equal to their actual 1985 emissions. Such sources can exploit this opportunity to make emissions reductions and transfer the allowances corresponding to such reductions to other units.

Pursuant to regulations to be promulgated by the Administrator under this new section, the owner or operator of such a unit may submit a proposal to the Administrator. If the proposal is approved, the unit shall receive allowances in accordance with the proposal as approved by the Administrator and shall become an affected source for purposes of the provisions of this new title.

The baseline for sources opting in under this provisions shall be calendar years 1985, 1986, and 1987 or an alternative baseline established by the Administrator. The emissions limitations shall be the product of a unit's baseline multiplied by the lesser of the unit's 1985 actual or allowable emission rate in pounds per million Btu (or an emission rate as determined by the Administrator if the unit did not operate in 1985) divided by 2,000. The Administrator shall issue transferable allowances in an amount equal to the limitation calculated by the Administrator.

New section 410(e) provides that the Administrator shall promulgate regulations for process sources electing to designate such sources as affected under this title. The Administrator shall establish emissions limitations for this category of sources electing to be affected sources for the purposes of this title.

Sources electing to be affected pursuant to this section shall not be eligible, under subsection (f), to transfer or bank allowances produced as a result of a unit's shutting down and ceasing operation. In no case may the Administrator permit a source to receive allowances in excess of the amount equal to the emissions that result from, or would result from, the source's operating in full compliance with the Act prior to enactment of the bill.

Excess Emissions Fee.—New section 411 of the Act imposes an automatic fee and emissions offset requirement for any unit that fails to comply with its emissions limitation obligations under this title. The fee, set at $2,000 per ton and adjusted for inflation, is designed to be higher than the cost of compliance. In addition to paying the fee, non-complying units are required to secure emissions reductions to offset the illegal excess emissions they generated in failing to comply with their emissions limitations.

The owner or operator of any unit that must meet an emissions limitation requirement pursuant to this title and that emits SO_2 or NO_X in excess of the applicable emissions limitations or in excess of the allowances it holds for such emissions shall pay, without demand, a sum equal to the product of $2,000 multiplied by the number of excess tons emitted. Section 411(c) requires the Administrator to adjust annually the per-ton monetary amount to reflect inflation, based on the Consumer Price Index.

In addition to such payments, the owner or operator of a unit that has exceeded its emissions limitations must secure, in the following calendar year, emissions reductions to offset, by an equal tonnage amount, the excess emissions it has generated. Within 60 days of the end of the calendar year in which the excess emissions occurred, the owner or operator shall submit a plan of achieving the necessary emissions offsets. The Administrator shall deduct from the allowances otherwise allocated for the year following the year in which the excess occurred allowances equal to the tonnage amount of the excess.

Monitoring, Reporting and Recordkeeping Requirements.—New section 412 requires that all sources subject to the emissions limitation requirements of this title install, operate, and assure the quality of the data produced by, continuous emissions monitors for sulfur dioxide, oxides of nitrogen, opacity and volumetric flow for each unit subject to the title. This requirement, along with the recordkeeping and reporting requirements of this new section, is intended to provide thorough and precise information concerning, as well as measurement of, each unit's emissions. The Administrator may permit alternative methods of supplying data, but only if those alternatives provide data and measurements with exactly the same precision, reliability, accessibility and timeliness as that provided by continuous emissions monitoring. In addition, the Administrator is to promulgatge regulations for recordkeeping on, and reporting of, the information from such systems.

The new section also prescribes the schedule under which sources shall be required to install and operate continuous emissions monitoring systems. New section 412(d) stipulates that in circumstances in which required continuous emissions monitoring data is not available for any affected unit, the Administrator shall deem the unit to be operating in an uncontrolled manner during the period for which the data is unavailable. If as a result of this, the unit is deemed to have emitted SO_2 or NO_X at levels in excess of its emissions limitations under this title, the owner or operator shall be subject to the excess emissions obligations of new section 411.

General Compliance with Other Provisions.—New section 413 states that compliance with the requirements of title IV does not exempt or exclude the owner or operator of any unit subject to the requirements of this title from compliance with any other applicable requirements of the Act.

Enforcement.—New section 414 of the Act provides that a violation of the requirements of this title is a violation of the Act.

DISCUSSION

Allowance Program for Existing and New Sources.—The system of marketable allowances established under new section 403 of the Act, together with the continuous emissions monitoring requirements of new section 412, is the compliance linchpin for sources subject to the emissions limitations imposed by new title IV. New section 403 of the Act provides the basic design of the allowance system. New sections 404, 405, 406, 407, 409 and 410 of the Act specify the emissions limitations of each source. When the regulatory program under this title is fully implemented, the ultimate measure of complaince for a source will be its ability to match its actual annual emissions with the number of annual allowances it holds. In fact, new section 411 imposes financial and emissions limitation obligations on the owners and operators of units failing to hold enough allowances to match their units' emissions.

The owner or operator of each unit that must meet a sulfur dioxide or oxides of nitrogen tonnage-based emissions limitation under new title IV (i.e., all but those units subject to subsections (c) and (h) of section 405) will receive from the Administrator annual allowances equal in number to the tons of annual emissions that each unit is permitted to emit once the title's subject to the Phase I requirements of section 404 that must reduce its current SO_2 emissions to no more than 12,000 tons a year beginning in 1995 will receive 12,000 allowances for each of the years between 1995 and 2000.

By the beginning of Phase II, the sources subject to the requirement of this title shall be emitting no more than 8.9 million tons of sulfur dioxide annually, although emissions may, in fact, exceed this level until December 31, 2004 to the extent that sources opt to comply with section 409. (This total may also vary to the extent that sources achieving greater reductions than required in Phase I carry a corresponding number of allowances forward for use in Phase II.) Thus, the Administrator's authority to allocate and issue allowances is circumscribed by the annual 8.9 million ton emissions constraint.

To demonstrate compliance at the end of each year, the owner or operator must submit to the Administrator continuous emissions monitoring data (as required under new section 412 of the Act) and allowances allocated for that year, or remaining from previous years, that equal the unit's emissions.

This approach reinforces the overall tonnage-performance approach of the reduction program established under new title IV of the Act. The objective of the title is, of course, to ensure that a specific number of tons of SO_2 and SO_x are removed from the atmosphere each year so that on an annual basis no more than 8.9 million tons of SO_2 are being emitted by utilities. In the face of projected SO_2 emissions growth, estimated to be as high simply be unattainable unless specific tonnage limitations were imposed on each unit.

Allowances are transferrable both between units and from a current year to a future year. Any unit that reduces its emissions more than is required will be required to surrender to the Administrator fewer allowances than have been allocated to it. The remaining allowances can be transferred to another unit for its use in meeting its compliance requirements. Alternatively, the remaining allowances can also be applied to meet emissions requirements in a future year.

The transferrability of allowances between units and to future years is the key both to the strong environmental policy sought in new title IV of the Act and to the flexibility the title creates for sources in choosing the means for complying with their emissions obligations. Since units can gain cash revenues from the sale of allowances they do not use, they will have a financial incentive both to make greater-than-required reductions and/or reductions earlier than required. In practice, economies of scale will amplify these incentives for the highest emitting units located in areas like the Midwest whose emissions are of the greatest concern to areas in the Northeast and Canada adversely affected by acid deposition. EPA projects that additional and/or early emissions reductions will be made by units in states like Pennsylvania, Illinois and Ohio whose emissions play a significant role in the ecological degradation associated with acid deposition.

Since selling unused allowances is tantamount to selling emissions reductions, the incentives created by the allowance market should stimulate innovations in the technologies and strategies used to reduce emissions. Coupled with the overall flexibility in compliance that the title affords sources, the allowance market should encourage sources to exploit energy efficiency; enhanced emissions reduction or control technologies—like sorbent injection, cofiring coal with natural gas, integrated gasification combined cycles; fuel-switching and least-emissions dispatching in order to maximize emissions reductions.

At the same time, the flexibility created by the allowance-trading system alone has been estimated by the EPA to produce a nationwide cost-savings of 50 percent in Phase I of the program, 14 percent to 20 percent when the program is first fully implemented at the beginning of Phase II and a 20 percent cost-savings in 2010.

On a regional basis, allowance transfers also yield significant cost-reductions. In testimony before the Committee, the Environmental Defense Fund applied EPA's cost analysis to different geographic regions to reveal the following regional impacts:

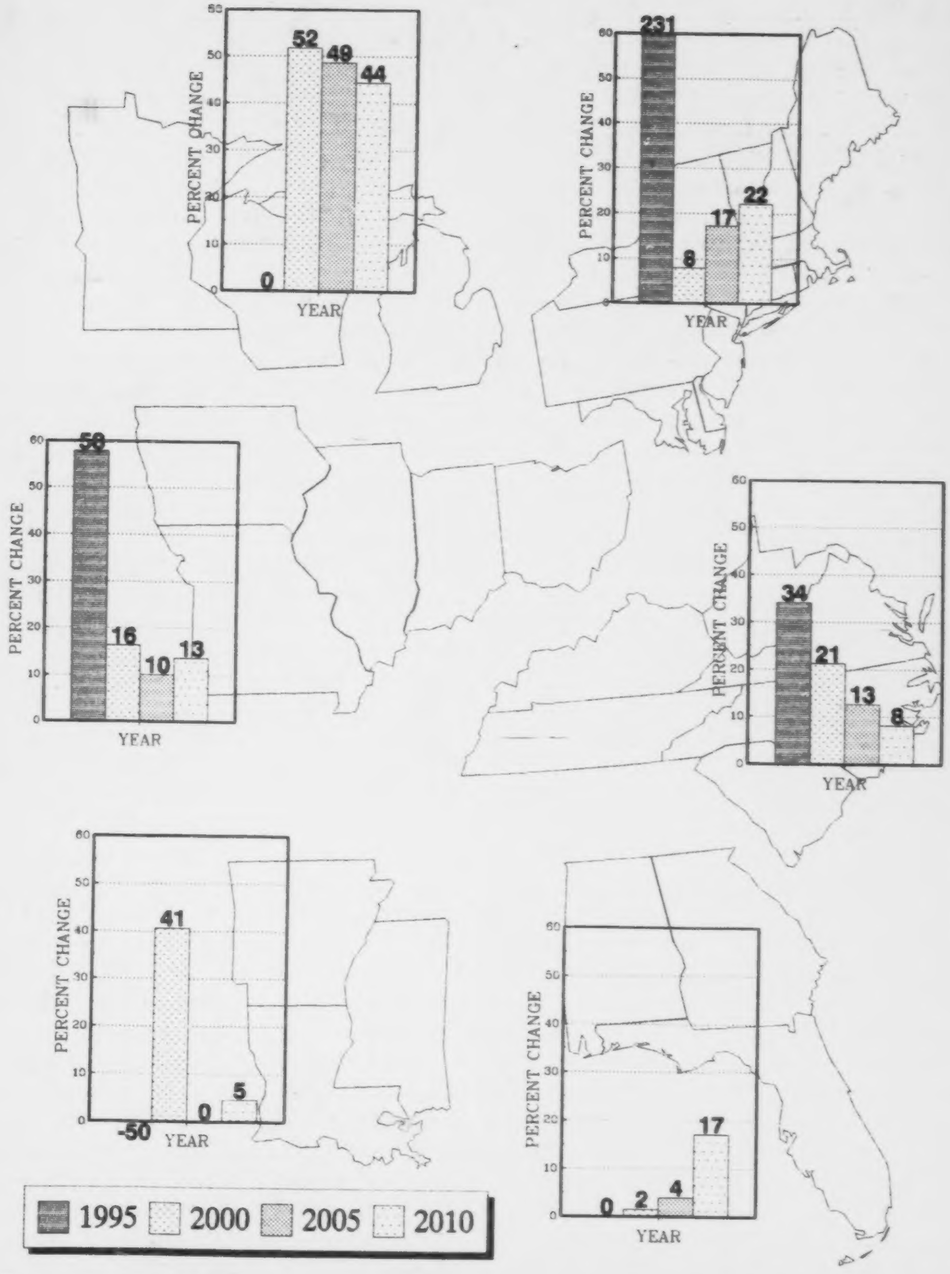


FIGURE IV-19.—Cost changes if trading is restricted (Daniel J. Dudek, Ph.D., Environmental Defense Fund, using data furnished by the EPA).

Thus, allowance-trading can yield cost-savings for the region comprising Iowa, Missouri, Illinois, Indiana and Ohio of 58 percent in 1995, 16 percent in 2000, 10 percent in 2005 and 13 percent in 2010 as compared to the cost of the same reduction program if there was little or no allowance-trading. Similarly, the region comprising the New England and Mid-Atlantic States can exploit allowance-trading to yield cost-reductions of 231 percent in 1995, 8 percent in 2000, 17 percent in 2005 and 22 percent in 2010 (the 231 percent figure represents the theoretical possibility that in 1995 sources in the region can earn more money from selling allowances than it would cost them to produce the additional reductions necessary to make those allowances available for sale). The States of the "upper South" would also achieve cost-savings ranging from 8 percent to 34 percent between 1995 and 2010.

Allowance-trading reduces costs both to units with substantial reduction obligations and those with smaller reduction requirements, particularly in regions facing increasing energy demands. The former enjoy economies of scale. While their total of required reductions and gross costs may be high, the cost of reduction on a per-ton or marginal basis may be relatively low even for reductions made beyond the required level. In contrast, lower-emitting and/or growth-area units may have higher marginal costs than those for plants in the former category. Since allowances are marketable, high-emitting plants would be able to make more cost-effective reductions than required and sell the resulting unused allowances to plants whose on-site reduction costs would be higher than the purchase price of allowances. A sale of unused allowances would allow the seller to offset some of its total emissions reduction cost and allow the buyer to meet its reduction obligations at a lower cost than if it were forced to make all of its reductions on-site.

Units in States like Florida facing dramatic growth in energy demand and projected emissions growth between 1985 and the period from 2000 to 2010 in the 80 percent to 86 percent range, could use the allowance market to reduce the cost of complying with the emissions limitations of this title by 11.5 percent in 2000 and 27 percent in 2010, according to EPA analysis. Similarly, North and South Carolina, facing aggregate projected emissions growth in this same period in the 66 percent to 74 percent range could reduce compliance costs through the allowance system by 18 percent in 2000 and 9 percent in 2010, according to EPA analysis. [EPA's *Economic Analysis of Title V (Acid Rain Provisions) of the Administration's Proposed Clean Air Act Amendments (H.R. 3030/S. 1490)*, September, 1989, addressed a program substantially similar to new title IV. Both programs include identical SO_2 reduction requirements, with new title IV establishing compliance deadlines 364 days earlier. The programs differed in that sources not required to make emissions reductions were permitted to increase emissions under the President's proposal only if they maintained their 1985 emissions rates. Since many utilities reported that such a provision would be prohibitively expensive, title IV simply allots permissible tonnage emissions increases to this category of sources for the purpose of reducing costs.]

The following hypothetical demonstrates the mechanics of an allowance transfer: Unit A emits 25,000 tons of SO_2 annually and is allocated 10,000 allowances, requiring it to remove 15,000 tons of emissions to meet a 10,000 ton emissions limit. Unit A can remove 18,000 tons of emissions at a cost of $500 per ton. If it did so, it would need only 7,000 annual allowances to cover its own operations, leaving it with 3,000 unused allowances. Unit B emits 15,000 tons per year and is allocated 12,000 allowances. To remove

3,000 tons to meet its 12,000-ton/allowance limit would cost it $1,000 per ton. Unit B would clearly save money by purchasing unit A's 3,000 allowances at a price somewhere between $500 (unit A's cost) and $1,000 (unit B's cost) rather than incurring the $1,000 per ton cost of removing the emissions itself. If unit A sold its allowances to unit B in that postulated price range, then unit A could use the proceeds to lower its net compliance costs and unit B would be meeting its requirements for a lower cost as well.

The national and regional cost-savings analysis discussed above suggest that in practice such cost-saving opportunities will be plentiful. Moreover, by their business nature, utilities appear to be well-suited to create, and to take advantage of, an active market in emissions allowances. Since allowance transfers would be carried out with the full menu of prerogatives enjoyed by parties to conventional commercial contracts, utilities could structure allowance-transfer arrangements to meet their flexible long-term planning needs. Long-term contracts could provide the level of certainty utilities need and minimize speculative decision-making.

In the management of the power they produce and deliver, utilities already engage in power-pooling arrangements to ensure maximum flexibility and efficiency in supplying power. Allowance-pooling could easily track power-pooling activities. At the same time, utilities have substantial experience in making long-term power and capacity sales to other utilities and could to the same with allowances, enabling those with up-front capital costs to receive revenues at the time they are incurring their expenses. In fact, a utility seeking to obtain allowances in lieu of making on-site reductions in order to meet compliance could underwrite directly a portion of the control technology or other costs incurred by the utility from whom it was to obtain the additional allowances. Since these arrangements would permit both parties to reduce their respective net compliance costs, public utility commissions would not only be inclined to approve such actions, but would have strong incentives to encourage them. Indeed, both public utility commissions seeking to protect consumers from unnecessary rate increases, and shareholders concerned with profits, will pressure utilities to maximize the economic benefits of allowance sales.

All indications are that the market for allowances will be economically competitive and highly robust. According to the Council of Economic Advisers, owners and operators will be engaging a market that will be structurally competitive because ownership of allowances will not be concentrated. Examining just the 5.1 million allowances that will be issued to those existing units with affirmative reduction obligations in Phase II (representing only approximately 56 percent of the total allowances issued), the Council found that the top 3 public utility holding companies will be allocated only 26 percent of this partial total of allowances. The top 13 holding companies together will be granted only 57 percent of this partial total and the six states holding the most allowances account for less than half of this partial total. Using the Herfindahl-Hirschman Index normally applied by the Justice Department to classify levels of market concentration, the Council found that the Index for this segment of the allowance market alone is no more than

400. Under the Index, any rating below 1000 is characterized as unconcentrated.

In promulgating regulations under subsection (b) and (d) of new section 403 establishing the system under which allowances will be transferred between and among private parties and tracked and accounted for by the Administrator, the Administrator must be mindful of the primary objectives of new title IV. First, allowances are a regulatory implement for ensuring that the aggregate emissions limitation requirements set forth in new title IV of the Act are met. The Administrator must ensure that ultimately there is a precise match between allowances and emissions, and that the regulations do not inadvertently give sources opportunities to produce emissions in amounts that exceed their allowances.

Second, the allowance system is intended to maximize the economic efficiency of the program both to minimize costs and to create incentives for aggressive and innovative efforts to control pollution. In formulating regulations the Administrator should be mindful that to exploit the efficiencies afforded by the allowance system, parties will transfer them between them and among themselves pursuant to a wide variety of commercial arrangements such as under leases, sales agreements and exchanges between emissions and electric power or capacity. The Administrator should not restrict unduly the ownership of allowances. In fact, ownership of allowances by brokers, investors and other market makers will maintain fluidity in the allowance market, link ultimate utility buyers with original sellers and facilitate rational price-finding.

Since units are permitted to transfer or assign allowances to other units, the Administrator, at the Administrator's discretion, may choose to issue allowances in accordance with such assignments, diminishing the number of allowances issued to the assigning unit and issuing a correspondingly increased number of allowances to the assignee. If the Administrator chooses to adopt such a practice for assignments between operating units, the retirement of an assignor unit should not affect that practice or the number of allowances issued to the unit's owner or operator pursuant to that practice if the Administrator chooses to continue the practice, assuming, of course, that the assignment remains effective subsequent to the unit's retirement.

To promote the flexibility that allowance transfers can provide, the Administrator should assure that transfers become effective as quickly as possible with minimal burdens on the parties to the transfer. Since the essential compliance event under new title IV is matching each unit's actual emissions with the number of allowances it holds, no unit should be legally entitled to avoid its emissions limitation obligations under this title by claiming possession of allowances held, and applied to compliance, by another source. Thus, transfers should be virtually automatic to minimize or eliminate such claims, for once a transfer was deemed effective, by definition, only one unit could claim the transferred allowances.

New section 403(b) of the Act does not limit units' ability to bank allowances for use or transfer in the years subsequent to those for which they are issued. The subsection creates a presumption against the Administrator's setting any limit on the amount of time during which a unit's owner or operator may bank or save allowances before using or transferring them. However, if the Administrator finds that owners and operators are engaging in, or are likely to engage in, extreme practices that would defeat the environmental protection or economic efficiency objectives of this title, the Administrator may impose suitable limitations.

New section 403(b) of the Act permits transfers of allowances only within two geographic regions. The Administrator should give exclusive consideration to the environmental protection objectives of this title in defining such regions. The boundaries of the regions should be drawn for the express purpose of promoting those objectives and ensuring that the emissions reductions required by this title are achieved.

The purpose in characterizing the legal or property status of allowances in new section (f) of the Act is to make clear that regulatory actions taken subsequent to the issuance of allowances are not subject to the "takings clause" of the U.S. Constitution. Allowances are, in large part, simply iterations of each unit's permit under this title. Since the permits will be, in effect, legally binding statements of each unit's emissions limitation obligations under the pollution control program established herein, the subsection makes clear that should Congress or the Administrator limit, revoke or otherwise modify the allowances or the underlying regulatory program established by new title IV of the Act or the regulations promulgated pursuant thereto, the U.S. government will not be obliged to compensate allowance-holders for loss of the allowances or any loss in their value. Allowances are but the means of implementing an emissions limitation program, which can be altered in response to changes in the environment or for other sound reasons of public policy.

At the same time, the allowance system is designed so that the allowances will be treated in part like economic commodities and that as such they will stimulate pollution sources to engage in actions that will advance both the environmental and economic objectives of this title. Accordingly, allowance holders should expect that allowances will partake of durable economic value and that commercial, antitrust and other relevant laws will apply to allowances and function to protect that value.

New section 403(e) requires, beginning January 1, 2000, that owners and operators of new units hold allowances equal to the tons of sulfur dioxide their units emit each year. This is virtually identical to provisions proposed by the President in July, 1989. Since allowances are allocated and issued only to existing units, new units must obtain allowances from other sources to offset their own emissions. As a result, new units will not increase the net total of sulfur dioxide emissions from utility sources once the SO_2 reduction program is fully implemented. Ultimately, the new unit offset requirement enacts the expectations underlying the current Act, that older, higher-emitting sources gradually will be replaced with newer, lower-emitting ones. The new unit offset requirement does little more than create incentives for accelerating this trend and increasing the likelihood of an eventual decline in total pollution.

The absence of a post-2000 "cap" on emissions in the form of a new source offset requirement would quickly defeat the objectives of title IV, which are to curtail acid rain by limiting total utility SO_2 emissions to no more than 8.9 million tons per year. EPA projects that between 1985 and 2010 new sources, though relatively low-emitting on a unit-specific basis, will add between 800,000 and 2.7 million tons of annual SO_2 emissions in the absence of an emissions "cap". Such emissions growth, if unchecked, would clearly undermine the purpose of the title. The requirement of 403(e) are intended to spur new unit owners and operators to minimize their net emissions in the first instance and to offset those emissions they cannot control or eliminate.

This aggregate emissions cap is the final ingredient in a recipe for promoting energy conservation as a principal method for reducing acid precursor pollutants. By reducing the amount of fossil-fuel consumed in the process of providing required energy services, energy conservation has the broadest range of environmental benefits simply because it leads to the reduction of all pollutants resulting from fossil fuel use. Energy efficiency is a crucial tool for controlling the emissions of carbon dioxide, the gas chiefly responsible for the intensification of the atmospheric "greenhouse effect". In the last several years, the Committee has received extensive scientific testimony that increases in the human-caused emissions of carbon dioxide and other greenhouse gases will lead to catastrophic shocks in the global climate system. Accordingly, new title IV shapes an acid rain reduction policy that encourages energy efficiency and other policies aimed at controlling greenhouse gases.

In addition to the clear environmental benefits, a host of economic considerations compel the promotion of energy efficiency in controlling pollution. Since so much of our energy fuel supplies are imported, efficiency and conservation can help rectify the current foreign trade imbalance and enhance our energy security. At the same time, energy efficiency is fuel-neutral, permitting energy producers to use the lowest-cost fuels to meet energy needs.

Including the new unit offset requirement, three elements of title IV are crucial to this objective. First, the emissions limitation requirements of the title impose fixed limits in the number of tons of SO_2 and NO_x—as opposed to a limit in the rate at which those pollutants are emitted—on each utility unit. The most economical way a unit can reduce its actual emissions tonnage is by increasing the efficiency with which it produces energy and delivers energy services. If less fossil fuel is consumed in providing the same energy services, the fewer pollutants will be emitted. Merely requiring that a unit limit its emissions rate without limiting its total tonnage would exclude energy conservation and efficiency from any role in achieving compliance since a unit could burn increasing amounts of fuel without increasing the rate at which the fuel was burned.

In tandem with this tonnage-specific limitation, the new-unit offset requirement is the second crucial element in title IV's energy conservation strategy. EPA's 1989 Base Case projection for sulfur dioxide emissions forecasts both a low emissions alternative path and a high emissions alternative path that in 2010 yields 4.5 million tons more SO_2 emissions than would be generated on the lower emissions path. In addition to variations in fuel prices, energy conservation is the most significant variable separating high emissions growth from low. In fact, a mere 1 percent increase in energy efficiency would put utilities on the low emissions path and save approximately $15 billion in energy costs and about 10 percent in utility carbon dioxide emissions.

The fixed tonnage limitation requirement and the new-unit offset requirement give utilities incentives to prefer the lower emissions path. By adding to the cost of building and operating a new plant, the need to purchase offsets increases the value to utilities of using existing capacity more efficiently. Similarly, by adding to the cost of consuming fuel the emissions limitations on existing plants increases the value of producing energy and delivering energy services more efficiently.

Because sources can take advantage of energy efficiency, the final crucial element for promoting energy conservation is the compliance flexibility provided under new title IV of the Act. This flexibility allows sources to put energy conservation, normally the lowest-cost compliance option, at the top of the list of methods they will use to reduce and control emissions.

Thanks to the flexibility created by the transferrability of allowances, no individual unit will in practice be bound to a fixed emissions cap by either the emissions limitation requirements or by the new-unit offset requirement. As a result, neither of these requirements will impair utilities' ability to service the energy demands of a growing economy. In fact, history demonstrates that there is little correlation between emissions growth and economic growth. Between 1970 and 1987, the U.S. economy grew substantially, but SO_2 emissions decreased by 28 percent in that period. During that same period electricity generation increased by 76 percent and coal use increased by 50 percent.

Individual new units will be able to operate at extremely low emissions levels, minimizing their offset burdens. First, near-term energy capacity needs will be met by a mix of technologies that include gas turbines and gas-fired combined cycles, which produce low emissions on a unit-specific basis. Second, over the longer term, new coal-fired capacity will be used and coal-fired new units will be able to respond to the offset requirements by creating "internal offsets", reducing thereby their "net offset" requirements. For example, new coalfired units could simply increase the efficacy of their emissions reduction methods. EPA estimates that increasing emissions removal by 5 percent would reduce by 0.5 million to 1.7 million tons the 0.8 million to 2.7 million tons of emissions otherwise projected for new units between 2000 and 2010.

EPA estimates that if new units in effect internalize the offset requirement by increasing the efficacy of emissions control technology in this way and by also using lower sulfur content fuels, the resulting emissions for which they must seek additional offsets will total no more than 300,000 to 800,000 tons between 2000 and 2010. At the same time, the reservoir of potential offsets for those emissions will be more than ample. EPA estimates that expanded application of energy conservation will generate approximately 500,000 tons of offsets and that repowering existing units, which often entails lowering emissions while increasing capacity, will produce another 600,000 tons of offsets. In addition, the agency has identified 800,000 tons of voluntary, cost-effective reductions from industrial and process sources. In all, EPA estimates that the combination of internally offsetting or minimizing emissions in the first instance and acquiring offsets from the plentiful supply expected to be availble will increase the cost of building a new powerplant by only 4 to 5 percent.

In addition, throughout the program, the retirement of exiting units could prove to be a key source of new unit offsets. The EPA estimates that the emissions reductions achieved when a large uncontrolled boiler is retired or repowered could provide offsets for units with three or four times the capacity of the retiring unit.

Finally, the allowance system itself will facilitate new units' access to the needed offsets. Because the allowances market will create incentives for overcontrol—that is, for more emissions reductions than required—new units will be engaging a market already rich with incentives for existing sources to use energy conservation, repowering and improved control technology to achieve the emissions reductions that new units can acquire in the form of offsetting allowances.

The imposition of the offset requirement is crucial to preserving the economic integrity of the allowance market. Were new sources permitted to operate without acquiring offsets, then the value of the investments made by existing units in overcontrol for the purpose of creating tradeable and bankable allowances would be undermined. A source will achieve "extra" emissions reductions for the purpose of retaining some of the allowances allotted to it rather than expending all of its allowances to cover its current emissions. The allowances retained will be saved precisely for the purpose of applying them against, or offsetting, emissions at another source or produced at a future time.

The value of the those allowances will be determined in large part by the cost of reducing or avoiding the emissions against which they are applied. If some sources, in this case new ones, are permitted to add emissions and increase the total emissions from utilities rather than being mandated to offset their emissions, the value of allowances retained by other sources will be diminished since the new sources' emissions avoidance cost will be reduced to zero. Allowances are intended to function like a currency that is sufficiently valuable to stimulate efforts to acquire it through innovative and aggressive efforts to reduce emissions more than required. If the addition of new unit emissions creates inflation in the currency then the market incentives to earn allowances—that is, to reduce pollution—will be seriously weakened.

New section 403 of the Act creates one additional source of new unit offsets, intended to provide insurance against new units' inability to secure offsets in the private market. Under subsection (a), the Administrator is to allocate allowances for each unit subject to an emissions limitation under the title by calculating the total tonnage of sulfur dioxide or oxides of nitrogen each unit is permitted to emit on an annual basis pursuant to the several new sections that specify such emissions limitations. Before issuing allowances to the owners or operators of emissions-limited units—which the Administrator shall do at the time permits are issued under section 408—the Administrator must set aside two percent of each unit's allowances, issuing only the remaining 98 percent of its total allocation to each unit. The Administrator shall deposit the allowances withheld from each unit in an account under the Administrator's exclusive control and subject to the regulations promulgated pursuant to new section 403(a)(2) of the Act.

The primary purpose of this special account is to prevent those owners and operators of utility units to whom the allowances are issued under 403 from exploiting the new-unit-offset requirement as a barrier to entry into the electric energy marketplace for new units. Since new units are not eligible for the allocation and issuance of allowances by the Administrator, operators of existing units could block the operations of new units by withholding otherwise available allowances from the owners and operators of those new units.

While the evidence is strong that the market in allowances will be active, vigorous and robust, subsection (a) is designed to ensure that the initial allocation of allowances only to existing utility units does not interrupt or slow current trends toward a more competitive market in electric power generation. Current estimates are that competitive independent power producers will be contributing 40 to 50 percent of the United States' new generating capacity in the next 10 years alone. By increasing competition independent power production creates significant economic benefits and by relying on efficient, low-emitting technologies independent power production can promote environmental protection objectives as well. In fact, whether owned by conventional utility companies or by independents, new units are likely to produce electricity more efficiently and with lower emissions and the section is intended to avoid penalizing new units perversely.

Accordingly, the Administrator is to use the allowance reserve account under section 403(a) to enable the owners and operators of new units to comply with their emissions offset obligations if they find themselves unable to secure the necessary allowances in the private market for allowances. The Administrator shall make the allowances in the account available only to those owners and operators who are seeking allowances for the specific purpose of meeting the emissions offset requirements imposed on new units under section 403(e). At the same time, the Administrator shall not exclude any owner or operator of a new unit subject to 403(e) and legitimately seeking allowances for the specific purpose of compliance with 403(e) from eligibility for purchasing allowances from the Administrator's reserve.

Allowances obtained from the reserve shall be an option only of absolute last resort for new unit owners and operators, available only after the owners and operators have failed in vigorous attempts to obtain allowances from private parties. For the variety of reasons discussed above in analyzing the character of the allowance market, the likelihood is high that virtually every new unit owner or operator will succeed in obtaining allowances in the private market.

In keeping with this, it is essential for the Administrator to circumscribe stringently access to the allowance reserve. Before a new unit owner or operator is granted an allocation from the reserve, the owner or operator must make a rigorous showing that allowances are not otherwise available at a price below the price set in section 403(a)(2)(C). The Administrator should set strict criteria for such a showing. In addition, in promulgating regulations for the implementation of section 403(a)(2), the Administrator should consider fully establishing the practice of seeking, through publication of notice in the Federal Register, the transfer of allowances from a private party to a new unit owner or operator who otherwise meets the criteria included in the regulations. If that effort fails, then the Administrator shall sell allowances from the reserve to the owner or operator.

Owners and operators typically need to make long-term plans and commitments in order to finance, build and operate new units. As a result, some may be able to demonstrate a need for, and thus qualify for an allotment of, a total number of allowances that is greater than their units will need to operate in any one year. At the same time, owners and operators should be encouraged to take advantage of opportunities in the private allowance market that arise after the Administrator has made an allocation.

Accordingly, while the Administrator is required to make a full allocation of allowances to an individual unit reflecting the unit's demonstrated need, the Administrator has the discretion to issue such allocation allowances in installments and to receive payment in installments should the owner or operator of a unit so request. An owner or operator may request that the Administrator not issue all of the allowances allocated to a unit and would not be obligated to pay for allowances until they were actually issued. In addition, at the Administrator's discretion, the Administrator may respond to an owner's or operator's request for a written statement that allowances have been allocated for the owner's or operator's new unit, even in cases where the owner or operator has requested that the Administrator issue the allowances in installments. The Administrator may not reallocate to another unit or owner or operator allowances initially allocated to an owner or operator until the latter has declined the issuance of such allowances.

In keeping with its purpose of promoting the purchase of offset allowances in private market rather than from the reserve, the subsection authorizes the creation of a reserve that will hold no more than 178,000 annual allowances and set a price for sales of reserve allowances at $1,500 per allowance or ton. At no more than 178,000 annual allowances, the reserve by itself is unlikely to meet the full need for new unit allowances under 403(e). Similarly, by setting the price for reserve allowances at $1,500 per ton, the subsection should assure that the cost will be well above the highest cost of reducing emissions and well above the highest private market cost for allowances.

At the same time, the $1,500 price for reserve allowances should stimulate an inactive market without inflating prices. If new unit owners or operators are in fact forced to resort to the allowance reserve, the sales of allowances to them by the Administrator at $1,500 per ton will only demonstrate to private allowance-holders the economic value of selling allowances. Though the high price of reserve allowances could stimulate the market, it is unlikely to elevate prices in the private market for two reasons. First, as previously discussed, the economic structure of the allowance market is not at all concentrated. Amplifying this effect is the fact that only new unit owners and operators will be purchasing from the allowance reserve while the predominant exchanges in the private market will involve existing units seeking allowances for compliance with their emissions limitations. Second, private allowance sellers will always be competing with other compliance alternatives in the form of on-site reductions that would-be purchasers could make. Thus, the cost of achieving reductions, not the $1,500 reserve allowance price, will determine the private market price of allowances.

Phase I Sulfur Dioxide Requirements.—When fully implemented, new section 404 will result in annual sulfur dioxide emissions reductions of 2.8 to 4.4 million tons beginning on January 1, 1995.

The units listed in Table A are the only units with mandatory emissions reductions in Phase I of title IV, although units substituted in whole or in part for any listed unit shall also be required to make reductions by operation of the substitution provisions of subsections (b) and (c). The listed units represented those units with both the highest SO_2 emissions levels and the greatest opportunities to make cost-effective reductions. The number of allowances specified for each unit is equal to the number of tons of annual emissions to which each affected unit is limited.

The second sentence of subsection (a), in combination with the allowance/tonnage specifications of Table A, imposes, as a matter of law, an absolute emissions limitation obligation on each unit listed in Table A, notwithstanding any other provision contained in new title IV of the Act or the Administrator's default in implementing new sections 403 or 408 of the Act or any other provision. Thus, for example, even if the Administrator fails to implement the allowance or permit programs provided for in new title IV, the owners and operators of units listed in Table A bear an absolute obligation to meet the emissions reduction obligations of each unit listed. Further, such an obligation is sufficient to trigger liability under new section 411 of the Act or any other relevant provision of the or any other applicable law.

The owners and operators of affected units under new section 404 may achieve compliance through the transfer of allowances between and among allowance holders pursuant to the provisions of new section 403. This subsection does not imply any limitation—apart from those specified in new section 403 or the regulations promulgated thereunder—on the transfer of allowances between and among affected sources that receive allowances pursuant to this section and new section 403 of the Act. Rather, subsection (b) simply clarifies that the owners and operators of Phase I units may transfer, in whole or in part, those units' reduction obligations to other units under their control that would not otherwise receive allowances during Phase I—provided, of course, that they comply with the requirements of this subsection.

Since, during Phase I, however, allowances will be issued to only a minority of all utility units, subsections (b) and (c) expand the compliance flexibility of units required to make reductions under new section 404. Consequently, section 404 (b) and (c) establish the means by which the owner or operator of an affected unit listed on Table A may opt to have other, unlisted units under the owner's or operator's control provide all or part of the emissions reductions that the listed unit would otherwise be required to achieve. In implementing these provisions the Administrator's chief responsibility must be to ensure that the emissions reduction trading that an owner or operator proposes to undertake between and among the owner's or operator's units actually results in total emissions reductions that are equal to, or greater than, the emissions reductions that would have been achieved had the listed unit itself met the emissions limitations required of it in Table A. Accordingly, the owner or operator must submit an emissions reduction sharing or unit substitution proposal that demonstrates conclusively that the required reductions will be achieved.

Considering the potential benefits of the allowance trading system in general, this provision is intended to give the owners and operators of Phase I units opportunities and incentives for emissions reduction strategies that lower costs, maximize pollution reduction and promote energy efficiency and innovation.

Phase II Sulfur Dioxide Requirements.—The emissions limitations set forth in Phase II capture virtually every steam-electric utility unit in the 48 contiguous States and effectuate the 10 million ton reduction in annual sulfur dioxide emissions that is a chief objective of new title IV.

Specifically, new section 405 requires units with nameplate power generation capacity equal to, or exceeding, 75 MWe and 1985 emissions rates equal to, or exceeding, 1.20 lbs./mmBtu to reduce their aggregate annual emissions by between 8.1 million and 8.6 million tons from 1980 levels. All other units—with either smaller capacities or emissions rates below 1.20 lbs./mmBtu—are permitted to increase their emissions above current levels, but their emissions are ultimately controlled to ensure that aggregate emissions from utilities at no time after January 1, 2000 exceed an annual aggregate of 8.9 million tons.

New section 405 imposes, as a matter of law, an absolute emissions limitation obligation on each utility unit in the 48 States, notwithstanding any other provision contained in new title IV or the Administrator's default in implementing new section 403 or 408 or any other provision. Thus, for example, even if the Administrator fails to implement the allowance or permit programs provided for in new title IV, the owners and operators of units subject to the emissions limitations mandated in new section 405 have an absolute legal obligation to meet those limitations. Such an obligation is sufficient to trigger liability under new section 411 or any other relevant provision of the Act or any other applicable law.

New section 405 reflects a policy of imposing actual reduction obligations on higher-emitting units, which, as a general matter, can make the most reductions most cost-effectively. At the same time, by permitting emissions increases to occur at lower-emitting units, new section 405 adopts a form of least-emissions dispatching, encouraging increases in power production to occur at those units with lower emissions rates. In so doing, the section in effect rewards lower-emitting plants by permitting emissions increases at such units.

Subsections (c) through (h) permits lower-emitting units in this latter category to increase their emissions by approximately 20%, or approximately 650,000 tons per year. This is consistent with the emissions increases which the EPA has forecasted for these units beginning around the year 2000. Thus, new section 405 should not impose unanticipated constraints for these units in the aggregate. At the same time, in keeping with the objective of limiting total annual utility emissions to 8.9 million tons, the section requires that in the aggregate these units limit their emissions increases to no more than 650,000 tons per year.

The following table demonstrates the effect of subsections (c) through (h). The left-hand column states the 1985 emissions for each category. The middle column states the emissions in the year 2000 forecasted for each category by the EPA. The right-hand column states the emissions permitted under new section 405.

	SO2 EMISSIONS (millions of tons)		
	1985	2000 forecasted	2000 under sect. 405
COAL UNITS Above 1.2 lbs/mmBtu Below 75 MWe	0.6	0.4 *	0.4 *
COAL UNITS Below 1.2 lbs/mmBtu	2.3	2.8	2.8
OIL AND GAS UNITS Below 1.2 lbs/mmBtu More than 10% Oil	0.25	0.22-0.44	0.3
GAS UNITS Below 1.2 lbs/mmBtu More than 90% gas	0.0	0.0	0.0 **
RECENT UNITS Opened between 1985 and enactment	0.0	0.3	0.3
TOTAL	3.15	3.72-3.94	3.8 **

* Retirements forecasted.
** Possible increases from gas curtailments.

FIGURE IV-20. Phase two emissions as forecasted and under Section 405 (EPA).

In addition to those units with reduction requirements under subsection (b), the units subject to subsections (d), (e), (f) and (g) will be allocated and issued allowances in accordance with section 403. This will help assure that the market for allowances is robust and structurally unconcentrated since allowances would be issued to the broadest range and number of units. When Phase II is fully implemented, units subject to the reduction mandates of subsection (b) will be emitting approximately 5.1 million tons of SO_2 and their owners and operators will be holding an equal number of allowances. Units subject to the balance of the provisions of new section 405 will be emitting 3.8 million tons and their owners and operators will be holding 3.4 million allowances [units subject only to the emissions rate limitations of subsection (c) and (h) will not be issued allowances].

At the same time, by permitting transfers, the allowance market will enable the owners and operators of these lower-emitting units themselves to re-allocate the permissible increases among themselves to those units which most need to make such increases in response to growing demand for electric power. Some units, which were already operating at high capacity in 1985, 1986, and 1987 will receive more allowances than they will be able to use. Through the market, they will be able to transfer their excess allowances to units needing more allowances than will be made available to them through the initial allocation under new section 405. In effect, section 405 gives the class of cleaner emitting units 650,000 tons of emissions-growth allowances and the market grants their owners and operators the means to determine the appropriate unit by unit distribution.

Units with capacities below 75 MWe and emissions rates above 1.20 lbs./mmBtu are not afforded such emissions-increase allowances under subsection (c). On the contrary, the EPA forecasts that by the year 2000, aggregate annual emissions from these units will decline from 600,000 tons, the current level, to approximately 400,000 tons as a result of the retirement of older, non-cost-effective units in this category. If this emissions decrease does not in fact occur, section 405 will fall short of its emissions limitation objectives. Accordingly, further analysis may compel the imposition of addition limitations on these units—particularly if their differential treatment undermines existing incentives to reduce emissions from these units.

Units that are capable of being fueled by both oil and gas are bifurcated by subsections (f) and (h) to meet the emissions-increase needs of units that burn more than a negligible amount of oil, while assuring that a large number of unnecessary and excessive allowances are not issued. According to EPA analysis, all dual-fuel plants emitted 250,000 tons of SO_2 in 1985 and together are expected to emit anywhere from 220,000 to 440,000 tons in 2000. However, virtually all of these emissions, both current and future, are attributable to units that burn more than 10 percent of their fuel in oil on an annual Btu basis. Units whose annual fuel consumption is more than 90 percent natural gas have negligible SO_2 emissions. If all dual-fuel units were treated in the same way and were awarded allowances in accordance with subsection (f), then the total number of allowances issued would exceed by several hundred thousand the level of emissions forecasted for oil units. Although these allowances would be superfluous for natural gas units, they could be transferred to other units and would result in emissions increases at those units, which would, in turn, defeat the program's 8.9 million ton emissions limit objective.

If, to prevent this outcome, no more than the 300,000 allowances provided for in subsection (f) were allocated to all dual-fired units and not just to oil units, then gas units would still receive superfluous allowances, but oil units would not hold allowances sufficient to cover their forecasted emissions increases. Because the issuance of allowances to gas units is unnecessary, subsections (f) and (h) authorize those units whose annual fuel use includes more than 10 percent oil to increase emissions up to, but not beyond, approximately 20 percent, and those units whose annual fuel use includes more than 90 percent natural gas to continue to operate with only limitations on their emissions rates.

Subsection (f) includes in each oil unit's emissions limitations formula the unit's federally approved emissions limitation as opposed to its actual 1985 emissions rate. Nevertheless, the formula is designed to permit no more than a 20 percent increase in aggregate emissions from these units.

Subsection (h) includes a provision intended to prevent inequities for gas units. Gas units are subject to curtailments or interruptions in their supply of natural gas. During those periods they replace their gas with oil, which almost invariably has a higher sulfur content than gas and thus can lead to higher total emissions as well as higher emissions rates for those units. As a result, curtailments or interruptions in the supply of natural gas could force units to exceed their 1985 emissions rates. To avoid this, subsection (h) permits the owners or operators of units confronted with such circumstances to obtain allowances from the Administrator pursuant to section 403(a)(2) in order to enable lawful emissions increases from those units.

Credits for Clean States.—The bill adds a new section 406 to the Act, in effect, providing credit for States that have made substantial investments in sulfur dioxide control equipment, such as scrubbers. Existing utility units in States that emitted less than 150,000 tons of sulfur dioxide in 1985 and use a continuous system of technological emissions control on over one-half of their utility coal-fired capacity are not required to make additional interim reductions. These States are still subject to the post-2000 "cap" on emissions and new units within such States must obtain allowances in order to operate after that date.

This new section of the Act is an attempt to recognize the past efforts made by such States. The States affected by this provision are low in population with high pollution control costs so that the per capita costs are high. In the State of Montana, for example, over $500 million was spent on pollution control equipment for the Colstrip units while the total population of the State is only about 800,000 people. Montana utilizes scrub 92 percent of their coal-fired capacity and New Mexico utilities scrub 100 percent of their capacity. Utilities in the other States that appear to be covered by this section are similarly situated, with more than 80 percent of their utility coal-fired capacity subject to continuous SO_2 emissions control. In contrast, only 22 percent of national utility coal-fired capacity is subject to continuous SO_2 emissions control.

This provision does not exempt these States from all pollution control requirements. Sources in these States are subject to the NO_x requirements because no similar investment has been made in NO_x control equipment. Sources in these States are also prohibited from increasing their utility sulfur dioxide emissions after the year 2000. After the year 2000, existing utility units in these States must meet an emission limitation requirement that is the annual average sulfur dioxide emissions during the year 1996, 1997 and 1998. This provision therefore only allows qualifying States to avoid additional reduction requirements, in recognition of their past efforts.

Though uncertain, the emissions consequences of this provision are intended to be negligible and to have virtually no effect on the total tonnage reductions achieved under this title. Thus, this provision is not intended to defeat the total tonnage "cap" achieved through the new utility source offset requirement.

As is the case for all other units subject to emssions limitations requirements, new and existing units in the States qualifying for application of this section have an absolute legal mandate to meet such requirements beginning in the year 2000, and are subject to the relevant provisions of Act, including new section 411.

Nitrogen Oxides Emission Reduction Program.—New section 407 of the Act establishes a program for the reduction in emissions of nitrogen oxides from utility boilers. As is the case for units with SO_2 emissions obligations, units with NO_x emissions limitations will be issued allowances pursuant to new section 403 of the Act. The provisions of this section are designed to capture the most cost-effective emissions reductions and, when coupled with other NO_x reduction requirements of the bill, are expected to achieve a reduction of approximately a 2 million tons in annual utility NO_x emissions, as compared to 1989 levels, beginning in the year 2000.

Because the emissions limitations for one of the categories of units is based on future emissions, unit operators may seek to inflate their emissions rates, and therefore their emissions limit, during the measurement years, 1995 and 1996. To prevent this the Administrator is charged with scrutinizing unit's emissions during those years and discounting abnormally inflated emissions rates.

These requirements are intended to compel utilities to do no more than make most cost-effective reductions. While in past years the Committee has reported legislation that differentiated, and eased, the requirements imposed on cyclone boilers, here the provisions also differentiates, and eases, requirements for wet bottom and stoker boilers as well. This reflects the relative difficulty of controlling NO_x for these technologies.

In addition to incorporating a reduction requirement differential to reflect variations of cost and feasibility, the section, in conjunction with section 403 permits units to exploit cost-savings that may be available through allowances transfers. Also favoring the cost-effectiveness of this section is the development of new, lower-expense technologies. Sorbent injection and decreasing cost for selective catalytic reduction (SCR) may lower the expense of initial NO_x reductions even further. For example, SCR has long been viewed as prohibitively expensive, but recent dramatic declines in cost have brought the per-ton-removed price of this technology down to as low as $600, according to recent Electric Power Research Institute methodology followed by EPA. This is comparable to the cost of convential control methods like low-NO_x burners and thermal de-NO_x. However, the provisions in this section are not intended to mandate use of SCR or any other specific technology.

Reductions in emissions of nitrogen oxides from new coal-fired power plants are essential to prevent large increases in emissions of oxides of nitrogen projected by EPA for fast growing regions of the country, including the Pacific Coast States, Rocky Mountain States and the South-Central States. EPA's 1989 base case analysis shows that a 270 percent increase in utility emissions of nitrogen oxides are expected in the eleven Rocky Mountain States between 1989 and 2010.

Such large increases in emissions of oxides of nitrogen in these regions would cause a significant deterioration in air quality and additional decline in visibility. In addition, regional emission increases in oxides of nitrogen would increase acid formation and deposition in these regions. Data from National Acid Deposition Program monitoring stations show 40 percent or more of total acidity being deposited in the poorly buffered high-altitude watersheds. Large increases in regional emissions of oxides of nitrogen could also trigger formation of increased ozone levels in areas that currently meet the ambient air quality standards for ozone.

To minimize the contribution of new sources to this problem, the Administrator must propose and promulgate a revised New Source Performance Standard for both utility and non-utility fossil fuel steam generating units. In doing so, the Administrator must ensure that the revised standard fully reflects the improvements in NO_x reduction methods that have occurred since the time the current standard was promulgated. In addition, the Administrator must promulgate standards for NO_x emissions from large stationary diesel and turbine engines. Such standards must also reflect the latest developments in NO_x reduction methods.

Permits and Compliance Plans.—Units subject to the emissions limitations of this title must have permits in order to operate legally. New section 408 specifies the compliance planning requirements owners and operators of such units must meet in order to qualify for such permits. In effect, each permit must prohibit the unit for which it is issued from exceeding its emissions tonnage limitation and the applicable emissions rate.

To qualify for a permit the owner or operator of an affected source of unit must submit a compliance plan demonstrating the means by which the unit or source will meet its emissions limitations. While the showing must be specific and convincing and while Phase I compliance plans are legally binding on the unit before the permit is issued, the planning and permitting process is intended to be flexible in order to enhance the overall flexibility of the program. As a result, compliance plans may be amended upon notice to the Administrator for Phase I units or through the submission of revised plans to the Administrator or permitting authority and allowance-transfers are deemed to amend a unit's permit automatically. In short, compliance plans and permits are to be binding commitments to meet emissions reduction and limitation requirements in a timely fashion.

In general, the schedule for the submission of compliance plans and the issuance of permits is intended to give owners and operators sufficient time to explore and exploit the widest variety of compliance options while giving the Administrator or permitting authority sufficient time to review the plans.

Section 408(c)(1)(B) provides that owners or operators intending to comply with the requirements of section 404 of the Act by reducing utilization in an affected unit must specify the units to which their power production will be shifted to compensate for such reduced utilization—if such reduced utilization is not the fully demonstrable result of energy conservation and production efficiency. This is to assure that owners or operators do not attempt to circumvent the emissions limitation requirements applicable to units simply by utilizing an affected unit less and an unit with no tonnage limitations in its place. This is a potentially acute problem in Phase I where only a minority of all units are subject to emissions limitations. The practice could also occur in Phase II where units subject to section 405(c) are permitted to increase their emissions without limit. In either case, this practice, if unchecked could, frustrate the emissions reduction objectives of the program. A mere shift in power generation from one unit to another unit not itself subject to emissions limitations would not yield a true net reduction in emissions: whatever emissions were avoided from the first unit would only occur at the second.

When a compliance plan indicates that the subject unit will be meeting its reduction requirements by reducing utilization by 20% or more, then the owner or operator must account for the diminished production at the affected unit and identify those units that will be supplying production in its stead. To ensure that total emissions from the initially affected units and the units to which the production is shifted together equal no greater amount of emissions than would have occurred at the affected unit had it reduced emissions without load-shifting, all the units in question will be deemed affected units. Any unit to which the load is to be shifted will be allocated allowances equal to its 1985 emissions rate multiplied by its baseline.

In enforcing this provision the Administrator should consider any pattern or practice that is counter to the intent of section 404 and this title. Shifting load use, e.g., from a baseload to a peak load unit, without accounting for the emissions consequences of increasing use at another unit is not an acceptable compliance strategy for the purposes of this title as subparagraph (B) clarifies.

Repowered Sources.—New section 409 of the Act provides an extension for a subset of clean coal technologies specifically designed for, and applied to, boiler replacement or "repowering." These include, in accordance with new section 402(l) of the Act, atmospheric or pressurized fluidized bed combustion, integrated gasification combined cycle, magnetohydrodynamics, direct and indirect coal-fired turbines, integrated gasification fuel cells or a derivation of one of these techniques as determined by the Administrator, in consultation with the Secretary of Energy.

This extension is provided only for repowering technologies because these technologies require substantial modification or replacement of the boiler and other essential components. In order to utilize these technologies, the unit must be largely rebuilt. In contrast, other clean coal technologies involve retrofits of existing units which do not entail such substantial modifications and attendant protracted shutdowns. No extension, with a commensurate temporary loss of emissions reductions, is warranted for these latter technologies.

During the extension period, the Administrator shall issue annual SO_2 allowances equal to the affected unit's baseline multiplied by the lesser of the unit's federally approved State Implementation Plan limitation or its actual emission rate for 1995. Such allowances may not be transferred to any other source. Their issuance in this amount is intended solely to permit the unit to maintain its customary operations prior to the reduction compliance deadline. Consequently, they are not transferable to other units.

The owner or operator shall notify the Administrator 60 days before removing the unit from service to install the repowering technology. On that date, the source shall be subject to the requirements of new section 405 of the Act and allowances for the year in which the unit is removed from operation to install the repowering technology shall be calculated by multiplying 1.20 lbs/mmBtu by the existing utility unit's baseline divided by 2,000. Such allowances are transferable to permit the utility to increase generation, and presumably emissions, at other units for the purpose of replacing the repowered unit's generation during the period of technology installation.

Since clean coal technology affords repowered units substantially increased capacity with dramatically lower emission rates, and since the purpose of this new section is to encourage clean coal repowering specifically as a method of meeting the title's emissions reduction program, allowances allocated after repowering is complete shall be equal to the product of 1.20 lbs/mmBtu of SO_2 multiplied by the existing utility unit's baseline divided by 2,000.

Subsection (e) states that it is unlawful for any owner or operator of a unit subject to the requirements of this section to fail to comply with the requirements of this section.

Election for Additional Sources.—New section 401 of the Act provides that sources not otherwise subject to the requirements of title IV of the bill, or which, as a result of being subject only to emissions rate limitations, do not otherwise receive allowances, may voluntarily become part of the acid deposition control program and obtain allowances presumably for the purpose of making reductions and transferring the corresponding portion of the allowances they initially receive. This adds flexibility and can enlarge the universe of sources for which there are cost-effective reductions in emissions of SO_2 or NO_x. This section provides a useful additional source of reductions that can be made voluntarily by sources choosing to be affected by the provisions of this title. In fact, EPA has identified approximately 800,000 tons of annual reductions which industrial units and process sources can make cost-effectively.

There are a variety of circumstances that would persuade an owner or operator to "opt in" under this section. For example, utility sources with low emissions and increased demand for electricity may turn to industrial or process sources as a source of allowances to accommodate emissions limitation or new source offset requirements. The utility and industrial sources may contract with each other to exchange allowances and pollution control costs in order to assure the utility future sources of allowances for growth.

This section is intended to further the objective of achieving true net reductions of SO_2 and NO_x emissions. Accordingly, sources designated under this section shall receive allowances in an amount approximately equal to their average emissions in the 1985-87 baseline period in order to ensure that no more allowances than emissions are issued that allowances subsequently transferred to units with emissions limitation or offset obligations represent true reductions. In addition, as with all affected sources, sources designated under this section shall be subject to the monitoring, enforcement and excess emissions requirements of the title.

Excess Emissions Fee.—New section 411 of the Act requires that sources that emit SO_2 or NO_x in excess of the allowances such source possesses for any calender year shall pay an excess emissions fee of $2,000 per ton. This provision eliminates any financial benefit such owners or operators might have received from noncompliance with title IV. The fee, adjusted annually to keep pace with inflation, is designed to be high enough that pollution control options will always be cheaper than continuing to emit more pollution than lawfully permitted.

In addition, once a source is subject to the excess emissions fee, the source must also submit a plan demonstrating how it will reduce its emissions to achieve the requirements of this title, including specifically the requirement imposed in this section that the owner or operator of the source achieve or secure emissions reductions sufficient to offset fully the source's excess emissions. At the end of the calendar year immediately subsequent to the source's generation of emissions greater in amount than permitted to it, the source shall achieve emissions reductions on-site or effectuate offsets at other sources in an amount that will enable it both to meet its current emissions limitations and to offset its excess emissions. In that subsequent calendar year, the Administrator shall issue to the source allowances reduced accordingly.

To ensure that delay in compliance does not itself become an incentive for non-compliance, sources generating excess emissions shall, in effect, be strictly liable to fulfill the obligations of this section, which shall attach automatically—thus eliminating opportunities to use administrative of judicial processes as occasion for further delay.

Monitoring, Reporting, and Recordkeeping Requirements.—New section 412 of the Act provides requirements for continuous emissions monitors at each affected source and provides for regulations establishing recordkeeping and reporting requirements necessary to implement the requirements of this title.

Compliance under new title IV is defined explicitly in terms of actual emissions, not in terms of technology application or technology performance. Accordingly, the Administrator, other enforcement authorities and the public must have precise, reliable and timely information indicating the exact emissions of each unit in order to determine whether a source or unit has met its emissions limitations. Utility emissions of SO_2 and NO_x are capable of verification in a cost-effective manner through use of continuous emission monitors and it shall be the obligation of owners and operators of affected units to install, operate, keep records on the results of, and report the results of, continuous emissions monitors. Though the Administrator, in promulgating regulations, may consider permitting the use of alternative methods of emissions monitoring, the provisions of new section 412(a) are intended to create a strong, but not absolute, presumption against the use of surrogates in place of direct monitoring of emissions.

In promulgating regulations implementing these requirements, the Administrator must ensure the precision, sufficiency, currency and timeliness of emissions data as necessary to ensure and enforce, in turn, each unit's compliance with its emissions limitations, including the use and transfer of allowances. In addition, because of the central role of reliable emissions data, the Administrator should take special care to implement new section 412(d) stringently so as to create maximum incentives for compliance by units with the requirements of this section and the regulations promulgated thereunder.

REPEAL OF PERCENT REDUCTION (SECTION 402)

SUMMARY

Section 402 of S. 1630 amends section 111 of the Clean Air Act by repealing the 1977 amendments regarding percentage reduction. This is not intended to affect the actual emissions from new sources but merely modifies the way in which the definition of a standard of performance for new fossil fuel-fired stationary sources is expressed. The repeal of percent reduction requirements is in effect only so long as the cap on total utility emissions under section 403(e) remains in effect. In addition, EPA is required to revise its new source performance standard for fossil fuel fired stationary sources so that emissions from sources beginning operation after this section takes effect are no greater than would have occurred in the absence of this amendment.

DISCUSSION

In 1977, the Clean Air Act was amended to require that the new source performance standards for fossil fuel-fired stationary sources be expressed as a percentage reduction in emissions and uncontrolled levels. This amendment meant that coal alone, without regard to its sulfur content, could not be used to meet the new source performance standards as had been the case before 1977.

After 1977, all new sources, under the percentage reduction requirement, had to install a system on continuous emissions control. In practice, this meant that all new utility power plants burning coal had to install scrubbers even if they were burning low sulfur coal. This exacerbated a regional split over coal use and air pollution control that had existed for some time. The original intention of the provision was to prevent western low sulfur coal from shutting eastern high sulfur coal out of the fuel market.

The provisions of this title reduce the need for a percentage reduction requirement because of the total cap on U.S. utility emissions of sulfur dioxide. After the year 2000, utilities can emit only 8.9 million tons of sulfur dioxide. With an expanding economy, this will place a premium on the cleanest possible power plants. New sources will try to reduce their emissions as much as possible and will be required to purchase allowances for the differences in emissions.

This provision is in no way intended to allow an increase in emissions for pollutants for which a standard has been set under section 109. Sources commencing operation after this section takes effect cannot emit more than they would have emitted without this provision.

Subsections (a) and (b) remain in effect only so long as the national cap on utility sulfur dioxide emissions remains in effect. Should the cap be eliminated, this provision has no effect and percentage reduction remains in force. This is necessary to assure that aggregate emissions from new sources do not increase.

Subsection (d) amends section 169(3) of the Act to insert the words "clean fuels," after "including fuel cleaning" as part of the Best Available Control Technology (BACT) determination under Prevention of Significant Deterioration provisions. The intent of this amendment is to continue the requirements for case-by-case determinations of BACT as in current law. The Committee intends that the amendment will not result in an increase in the level of emission rates found to meet BACT, when compared on a case-by-case basis to BACT determinations under current law. The Administrator may consider the use of clean fuels to meet BACT requirements if a permit applicant proposes to meet such requirements by using clean fuel.

In no case is the Administrator compelled to require mandatory use of clean fuels by a permit applicant.

FEDERAL FACILITIES (SECTION 403)

SUMMARY

Section 403 of the bill requires the implementation of energy conservation measures and the use of renewable and clean alternative energy technology at Federal facilities which are in the service territory of an affected source under new title IV of the Act (section 401 of the bill).

Section 403(a)(1) requires that Federal facilities implement by September 30, 1995, those conservation measures that are found to be cost-effective. The provision only applies to federally owned facilities in the service territory of an affected source under new title IV of the Act and there are constraints on applicability which take into account size, technical considerations and feasibility.

Section 403(a)(2) requires the implementation at Federal facilities of cost-effective renewable and clean energy technologies. By January 1, 1995, Federal facilities that are in the service territory of an affected source, must satisfy 10 percent of the total electric energy needs of the agency's facilities in the affected areas by using systems which meet specified emission performance requirements.

Section 403(a)(3) limits the construction or acquisition of buildings unless the agency has complied with the requirements of this section.

Section 403(b) requires the implementation of cost-effective conservation measures in leased Federal facilities. This provision applies to new or renovated facilities that are greater than 35,000 square feet and where the federally leased space exceeds 70 percent of the building's leasable space.

Section 403(c) requires that the Administrator provide guidance on the implementation of this section and issue a methodology and guidelines for the conduct of life-cycle cost analyses required by subsections (a) and (b).

Section 403(d) requires that affected agencies submit an implementation report to EPA and the Congress by January 1, 1991.

Section 403(e) recognizes that certain agencies, such as the Department of Defense, operate many unique facilities and requires that the EPA cooperate with these agencies in the implementation of these provisions.

DISCUSSION

Section 403 of the bill requires the implementation of energy conservation measures and the use of renewable and clean alternative energy technology at Federal facilities which are in the service territory of an affected source under new title IV of the Act. The provisions of this section are applicable to the generation and use of electric energy only. The intent of this section is to:

(1) reduce the emissions of acid rain precursors by reducing the amounts of electric energy which are needed for a given task,

(2) promote the introduction of emerging energy technologies which are ready for commercialization, and

(3) save money for the Federal government.

Since these objectives are in the public interest, it is appropriate that the Federal government take a lead role by implementing actions at its Federal facilities to achieve these goals.

Section 403(a)(1) requires that Federal facilities implement those conservation measures that are found to be cost-effective by September 30, 1995. Conservation means the satisfaction of current needs with the expenditure of fewer resources. Studies by the Conservation Law Foundation of New England and the Natural Resources Defense Council show that the implementation of conservation measures is the most cost-effective, short-term means to satisfy increased energy demand while reducing emissions. However, the implementation of increased conservation measures has historically been difficult becuase electric utilities realize lower profits as consumers conserve energy. This is not an issue for Federal facilities.

Not all Federal facilities are affected by this provision. First, there are constraints on applicability set forth in sections (c) and (e) concerning size, technical considerations and feasability. Second, the provision only applies to federally owned facilities in the service territory of an affected source under Title IV of the bill. By reducing demand in these service territories, pollution is reduced, and monetary savings accrue over the investment period to the Federal agency. Moreover, the utility and service territory benefit, since growth may be able to be accommodated without the utility using its allowable emissions because the demand on the utility for energy will be decreased.

Section 403(a)(2) requires the implementation of renewable and clean energy technology at Federal facilities. Only cost-effective technologies are required. The use of these technologies, as required under this section, should reduce the pollution associated with electricity generation and provide a stimulus to the commercialization of United States-developed clean technologies which are cost-effective and currently are on the brink of commercialization. This is important for U.S. competitiveness in the international marketplace. Without support of this kind, U.S. capability to manufacture clean energy technologies with photovoltaic devices, solar thermal systems and fuel cells may well be lost to international competitors. This would be very short-sighted, as these technologies offer significant benefits over current systems from an environmental and energy efficiency perspective.

Section 403(a)(2) requires that, by January 1, 1995, Federal facilities which are in the service territory of an affected source, as defined under title IV of this bill, satisfy ten percent their present and future electric energy needs by using systems which meet the emission performance requirements specified. Each individual facility will not have to achieve ten percent compliance, but overall 10 percent compliance may be achieved from all the agency's facilities in affected areas.

Section 403(a)(3) limits the construction or acquisition of buildings unless the agency has complied with the requirements of this section.

Section 403(b) sets forth the requirements relating to leased facilities. The consumption of electric energy at leased Federal facilities is much less than at facilities which are federally owned, but this requirement is still important as part of the government's meassage to the private sector that conservation of electrical energy is something that the government takes seriously and that is cost-effective. The size and percentage occupancy criteria specified will eliminate the necessity of applying this requirement to any facilities except those that are large and where the Federal Government is the major lessee.

Section 403(c) requires that the Administrator of the Environmental Protection Agency provide guidance on the implementation of this section and issue a methodology and guidelines for the conduct of life-cycle cost analyses required by subsections (a) and (b). Life-cycle cost analyses should be broadly defined to incorporate the health and environmental and other societal costs associated with air pollution. Efforts to incorporate total societal costs into the evaluation of true energy costs have been made by the American Solar Energy Society and the California Energy Commission in this country. The Franunhofer-Institute for Systems and Innovation Research in Karlsruhe, West Germany, has made a similar effort. These prototype studies have found that total societal costs substantially exceed the current purchase cost of electricity generated using fossil energy when external environmental, health and safety, government subsidies, and security costs are considered. The bill does not endorse any of the specific methodologies listed; EPA should include them for evaluation and consideration in developing the cost-effectiveness methodological guidelines required by this section.

In addition, since some of the alternative technologies can provide both heat and electric energy, the benefits of on-site cogeneration opportunities should be considered. Finally, the agency should consider the national importance of developing domestic markets for emerging technologies, which would bring about a decrease in production costs for these technologies.

Only life-cycle costs with paybacks of not more than ten years should be considered to be cost-effective.

The applicability criteria provided in this subsection are intended to eliminate those facilities which face practical problems because they are small (although some small facilities may be particularly appropriate for compliance) or have special technical constraints or limitations. These provisions should be applied in a practical manner, and the Administrator may exempt a facility upon a finding of impracticality.

Section 403(d) requires affected agencies to submit an implementation report to EPA and the Congress by January 1, 1992. This report should include a detailing of any funds required for implementation.

Section 403(e) recognizes that certain agencies such as the Department of Defense operate many unique facilities. EPA should cooperate with these agencies in the implementation of these provisions.

Acid Deposition Standard (Section 404)

SUMMARY

Section 404 of the bill directs the Administrator of the Environmental Protection Agency to report to the Congress on the role that an "acid deposition standard" might play in protecting sensitive aquatic and terrestrial resources from the adverse effects of acid deposition. Such a standard might provide an upper limit on the wet sulfare that would be deposited on sensitive watersheds or forested areas in any one year. An acid deposition standard could be implemented under the Clean Air Act much as National ambient Air Quality Standards are currently implemented. In addition to reporting on the feasibility and effectiveness of such a standard, the Administrator is required to identify the sensitive and critically sensitive aquatic and terrestrial resources in the United States and Canada which might be protected by a deposition standard.

DISCUSSION

Title IV of the reported bill adds a new title IV to the Clean Air Act to control emissions of the precursors of acid deposition, principally sulfur dioxide and nitrogen oxides. The general structure of that control program is based on the findings of the National Academy of Sciences stated in a report entitled. "Acid Deposition: Atmospheric Processes in Eastern North America," which was published in 1983. Generally, the report was interpreted to indicate that the relationship between sulfur dioxide emissions and acid deposition is linear over the eastern half of the North American continent. One can conclude from that premise that a substantial reduction in SO_2 emissions will lead to a substantial, and nearly equal, percentage reduction in the acid compounds deposited in the northeastern United States and eastern Canada.

Second, the report indicated that a substantial reduction in emissions and deposition is necessary to protect the most sensitive aquatic resources. Witnesses appearing before the Committee have consistently indicated that a reduction in the range of 50 percent in emissions and deposition is necessary to protect the most sensitive resources from further acidification.

Furthermore, the report concluded that it is not possible to precisely target a control program on a limited number of identifiable points of emissions for several reasons. First, the weather patterns over the eastern half of the continent cause sufficient variation in transport and mixing of pollutants, that each source of emissions may adversely affect resources over a large area and, as a corollarly, receptors (sensitive watersheds and forested areas) may be affected by several point sources. And second, to the extent that strong source-receptor relationships actually do exist, the science is not sufficiently powerful to sort them out from the general pattern at this time.

Therefore, the Committee fashioned a control program calling for substantial reductions distributed according to an equitable formula over a very large area.

But that is not the only possible set of premises for an acid deposition control program. Other nations, including Canada, and some American States, including Minnesota, have built aggressive acid rain control programs on a different foundation. These programs start from an explicit acid deposition standard—a numercial limitation on the watershed or terrestrial loadings of acid compounds—designed to protect the resources most at risk.

The resources of concern are aquatic (lakes and streams) and terrestrial (forests) resources. These resources have some capacity to resist damage from the deposition of acid compounds. This resistance is called "buffering" capacity. The presence of naturally occurring elements like carbonates and calcium in the soil of a watershed can react with the acid compounds to prevent acidification of the water and soil resources. 40 units (microequivalent units of alkalinity per liter [μeq/1]) of buffering capacity is considered very low. Resources with buffering capacity below 40 μeq/1 are extremely sensitive to acid deposition. Resources with buffering capacity between 40 μeq/1 and 200 μeq/1 are considered moderately sensitive and subject to damage at existing deposition rates. Alkalinity is chosen from among several other possible indicators because it is a parameter that is now routinely measured by lake surveyors; it can be measured with reasonable accuracy by current technologies; alkalinity is relatively insensitive to contamination; and alkalinity is less subject to daily and seasonal variability than other measures of water quality such as pH.

Acid compounds are deposited in both dry and wet forms. But only wet sulfate deposition is currently measured with reliability.

Therefore, the acid deposition standards that have been established are generally expressed as wet sulfate deposition (in kilograms) over a land area (hectare, that is 2.5 acres) over a period of time (one year). The Minnesota standard is 11 kilograms per hectare per year. That standard was established to protect the critically sensitive resources in the Boundary Waters Canoe Area. The Canadian standard adopted to protect all but the most sensitive resources is 20/kg/ha/yr. Deposition rates less than this standard are not likely to result in further substantial acidification of the resources generally at risk.

Implementing such standards can be accomplished in a four step process. First, the buffering capacity of all aquatic and terrestrial resources is measured to identify those which may be sensitive or critically sensitive. Second, deposition monitoring is conducted in the area of the sensitive resources to determine whether the standard is being met. Third, and for those resources failing to meet the standard, source-receptor relationships are established which identify those emissions sources or groups of emissions sources which are causing deposition in excess of the standard. Finally, control requirements are imposed on the identified sources to assure that deposition will be reduced to levels below the standard.

Although the control program included in title IV of the reported legislation begins from a different set of premises, a deposition standard may nevertheless, and in the longer-term, be useful as an element of the national effort to protect aquatic and terrestrial resources from acid deposition. For instance, the standard may be used after controls are in place as a yardstick to determine whether they are, in fact, sufficient to protect the sensitive and critically sensitive resources at risk.

The reported bill directs the Administrator to conduct a study of the feasibility and effectiveness of an acid deposition standard and to report to Congress, not later than 36 months after enactment, on the role that a deposition standard might play in an acid rain control program.

The report is to include an identification of the sensitive (<200 μeq/1 alkalinity) and critically sensitive resources (<40 μeq/1 alkalinity) in both the United States and Canada. This is to be a detailed listing of the watersheds and forested areas which meet these definitions which identify the resources at risk. The identification of Canadian resources may be based on readily available data compiled by the Government of Canada or other sources and shall not require actual survey work. The identification of such resources in the United States is to be a census (not a survey) of U.S. resources that may be adversely effected by acid deposition at currently experienced rates.

In addition to the identification of sensitive and critically sensitive resources, the report prepared by the Administrator shall also include discussion of: (1) the numerical value(s) that such a standard(s) may take; (2) the use of such standards in the acid rain control program established by any of the several States or other nations; (3) means to integrate a deposition standard into the structure of the Clean Air Act and the control program established by title IV; and (4) the state of knowledge with respect to source-receptor relationships, buffering capacity and other factors which might affect the validity of the standard or the feasibility of its implementation.

NATIONAL ACID LAKES REGISTRY (SECTION 405)

SUMMARY

Section 405 directs the EPA to establish and maintain a registry of all lakes in the United States that are known to be acidified, and to update this listing as previously non-acidic lakes become acidic, or as acidified lakes become non-acidic.

DISCUSSION

Various sampling programs over the last 10 years have identified numerous lakes in the United States with abnormally high acidity. Much of this is due to acid deposition. The purpose of the registry established by this section is to track the progress of the emissions control program by changes in the population of acidified lakes.

It is unrealistic to expect the EPA to identify all or even a majority of acidified lakes. However, data on a representative sample of lakes from all regions, as was done for the National Surface Waters Survey, can be used as an indicator of the condition of lakes in general. Data collected and recorded in the Registry over the long term can be used to verify predictions regarding the deacidification of lakes under reduced deposition. The EPA should consult with the National Acid Precipitation Assessment Program to develop a proper definition for what constitutes an acidified lake.

In compiling the initial list of acidified lakes, the EPA should investigate all known sources of lake data.

INDUSTRIAL SULFUR DIOXIDE EMISSIONS (SECTION 406)

SUMMARY

Section 406 requires the Administrator to submit an inventory of industrial SO2 emissions not later than January 1, 1995 and to assure that total annual emissions from industrial sources continue to be 1.5 million tons lower on from 1980 levels, as EPA currently predicts will occur.

DISCUSSION

Section 406 of S. 1630 is a freestanding amendment that requires EPA to assure that the projected emissions decline in industrial sources in fact occurs. The emissions reductions from industrial sources are part of the 10 million ton reduction envisioned by this title and any failure to achieve the full 1.5 million ton reduction EPA claims will occur would undermine the integrity of the acid deposition program.

Subsection (a) requires EPA to submit an inventory of sulfur dioxide emissions from industrial sources not later than January 1, 1995. The inventory shall be updated every five years. The report shall also indicate likely trends in emissions over the following 20-year period.

Subsection (b) requires the Administrator to take action to assure that sulfur dioxide emissions from industrial sources do not exceed a level equal to a 1.5 million ton reduction below 1980 levels. EPA data indicates that such reduction has already occurred and that emissions will not increase. Since this is an essential component of the reductions sought under this title, this section merely assures that these projected reductions occur and will not be overcome by future growth in emissions.

SENSE OF THE CONGRESS ON EMISSION REDUCTION COSTS (SECTION 407)

Section 407 of S. 1630 is a free-standing Sense of the Congress resolution designed to express the sense of Congress that cost-sharing in the form of broad-based taxes and emissions fees to pay for the cost of reducing emissions under this title are undesirable. Other mechanisms that might rectify possible disparities in regional economic impacts are not addressed by this resolution.

CONTINUATION OF NATIONAL ACID DEPOSITION ASSESSMENT PROGRAM (SECTION 408)

SUMMARY

The purpose of the section is to provide for the continuation of the National Acid Precipitation Assessment Program beyond its original 10-year mandate. The NAPAP final report is scheduled to be released in September, 1990, and thereafter NAPAP was to be disbanded. This section extends NAPAP into the future, at a reduced level of funding, to monitor and assess the effects of the emission control program created by this Act.

The fundamental purpose of the post-1990 NAPAP will be serve as an impartial observer of the effects of the emission control program enacted by the Congress and the President and administered by the EPA. There is a need to have this function performed outside of the EPA both because of the resources that other agencies can bring to bear on the subject, and because of the advantages of independent, science-based review of such a regulatory program. In addition, after 10 years, NAPAP has established a strong relationship with scientists in all fields of acid rain research. This institutional strength is valuable, and should be used.

Subsection (a) provides that NAPAP be continued, and that its management structure be changed so that the EPA Administrator is the permanent Chairman of the Joint Chairs Council. This change is appropriate given the prominent role that the EPA has assumed regarding administration policy on acid deposition control.

Subsection (b) outlines the primary goals of the restructured NAPAP: to collect and analyze the data necessary to understand both the effects of emissions controls, and their costs and benefits.

Subsections (c) and (d) provide more specific outlines of what information, at a minimum, it is necessary for NAPAP to gather and analyze in order to meet the goals outlined in subsection (b). Subsection (c) is concerned with the collection and assessment of raw data, and subsection (d) for the use, maintenance, and improvement of atmospheric models.

Subsection (e) alters the present reporting structure of NAPAP. In the future, NAPAP will compile and submit one report every two years that shall be a comprehensive description of all that is known regarding the effects, costs and benefits of the emissions control program. This subsection also provides that, as is the present practice, NAPAP will submit a unified budget.

Subsection (f) authorizes expenditures of up to $10 million per year for this program. The Committee expects the Joint Chairs Council to make a recommendation regarding the appropriate level of funding to fulfill the objectives laid out in this section. The Congress will consider this request in its funding of NAPAP activities.

DISCUSSION

Legislation to create a federal task force to investigate acid rain was enacted as title VII of Public Law 96-294. As required by this statute, a research program was undertaken by an interagency task force supervised by a group of Joint Chairs. Since 1980, the annual funding for this program has risen to $82 million.

During this period, NAPAP has supported extensive research in virtually all aspects of the effects of acid deposition and its link to man-made emissions. NAPAP studies have examined the impact of acid deposition on surface waters, forests and crops as well as the visibility effects of acid precursor emissions. The section is intended to assure that research efforts building on those already undertaken under the auspices of NAPAP will continue in the context of evaluating the benefits and consequences of the regulatory program established by section 401 of the bill.

TITLE V—PERMITS

INTRODUCTION

Title V of the bill adds a new part B to title III of the Act. The Clean Air Act currently contains no explicit Federal requirement for sources of air pollution to obtain an operating permit. This is a serious gap in the current Act. Operating permits are needed to (1) better enforce the requirements of the law by applying them more clearly to individual sources and allowing better tracking of compliance, and (2) provide an expedited process for implementing new control requirements.

The failure of the current Act to require operating permits puts it at odds with the other major environmental statutes. The Clean Water Act (CWA) requires permits for discharges into the nation's waters. The Resource Conservation and Recovery Act (RCRA) requires operating permits for treatment, storage, and disposal facilities. Moreover, the RCRA manifest system, which tracks the movement of wastes, functions in many respects as the equivalent of a permit system. The Federal Insecticide, Fungicide, and Rodenticide Act requires the equivalent of permits for pesticides. The Toxic Substances Control Act authorizes permits with respect to chemical substances, and EPA has required them for PCB disposal facilities. The Clean Air Act itself requires construction permits for new or modified major sources of air pollution, and about 35 of the States have their own laws requiring operating permits for most minor and major sources as well.

In order to assure adequate compliance with the Act, there needs to be a Federal operating permit requirement as provided by the title. The operating permit program contained in this Act is based on the essential features of the Clean Water Act's permit program, which has successfully imposed pollution controls on large numbers of sources in a readily enforceable and administratively flexible manner. Although sources of air pollution tend to have more emission points, and thus be more complex, than sources of water pollution, the new air permit program will provide many of the same benefits as the CWA program, without unduly cumbersome requirements.

The first benefit of the title V permit program is that, like the CWA program, it will clarify and make more readily enforceable a source's pollution control requirements. Currently, in many cases, the source's pollution control obligations—ranging from emissions controls and monitoring requirements to recordkeeping and reporting requirements—are scattered throughout numerous, often hard-to-find provisions of the SIP or other Federal regulations. In addition, SIP regulations are often written to cover broad source categories, and may not make clear how a general regulation applies to a specific source. Moreover, in some cases, the source is not required under the SIP or other Clean Air Act provisions to submit periodic compliance reports to EPA or the States. As a result, there is no ready way to identify the extent of a source's compliance and noncompliance.

The air permit program will ensure that all of a source's obligations with respect to each of the air pollutants it is required to control will be contained in one permit document. In many cases, the permit will simply incorporate the requirements of the existing SIP or other Clean Air Act requirements, but in other cases, the permit will tailor and clarify how the general rules apply to the specific source. In addition, the source will file periodic reports, as determined by EPA regulations, identifying the extent to which it has complied with those obligations. Both the permit and the reports must be made publicly available.

This system will enable the State, EPA, and the public to better determine the requirements to which the source is subject, and whether the source is meeting those requirements. Better enforcement will result for all air pollution requirements, including SIP limits, new source performance standards, hazardous air pollution requirements, and acid deposition limits. In addition, this system will benefit stationary sources by providing greater certainty as to what their pollution control obligations are. Permits will also clearly identify baseline requirements for each source, facilitating emissions trading.

Another benefit of the permit program—which will accrue to regulated sources—is the simplification and expediting of procedures for modifying a source's pollution control obligations. In general, under the current Act, for sources subject to a SIP, the vast majority of changes in the source's pollution control obligations, no matter how minor, must be developed by the State and then approved or disapproved by EPA through informal, notice-and-comment rulemaking. This "double-key" system has long been recognized as being laborious and resource-intensive, and has led to unacceptably long delays in EPA action on even relatively minor SIP revisions. *See* Pedersen, "Why the Clean Air Act Works Badly", 129 *U. Pa. L. Rev.* 1059 (1981). Typically, EPA has taken 12–14 months to act on a SIP revision, and in some cases, EPA has taken much longer. The new permit program should eliminate this problem for source-specific SIP revisions by placing a strict time limit on EPA review. After the State revises the permit, EPA will have only 90 days to review it; if EPA takes no action, the revised permit will automatically become effective.

The permit program will also greatly augment the State's resources to administer pollution control programs. Throughout the 20-year history of the current Clean Air Act, inadequate State and local agency resources have increasingly hampered pollution control efforts. The permit fees provisions of this title will ameliorate this problem by requiring sources of pollution to pay a share of the costs of state air pollution programs, including, as discussed below, the costs of issuing the permit as well as the costs of modeling, monitoring, and preparation of attainment demonstrations and regulations that form the basis for air pollution control requirements.

Finally, the permit program provides a ready vehicle for the states to assume responsibility for administration of significant parts of the air toxics program and the acid deposition program. States that are delegated responsibility for these programs will use the permit systems to administer them, with the resulting advantages of better enforcement and a means for EPA oversight.

SUMMARY

Title V of the bill imposes a Federal requirement that major sources of air pollution, and certain other sources of air pollution, obtain operating permits. Modeled after the permitting, provisions of the Clean Water Act, this requirement will substantially strengthen enforcement of the Clean Air Act. It will also ese the procedures for changing a source's pollution control requirements, by supplanting the cumbersome State implementation plan (SIP) revision process with an expedited permitting process that imposes strict time limits on EPA review.

Three years after enactment, States are to submit operating permit programs, in accordance with EPA regulations. EPA must approve or disapprove the State program within one year after submission. EPA may approve or disapprove the State program in whole or in part, and sanctions are available in the event of disapproval.

Not later than six months after EPA approves the State program, specified sources, defined below, must submit permit applications to the State. After informing EPA and contiguous States, and allowing for public comment, the State must sumit a proposed permit to EPA. EPA has 90 days to review the permit. If EPA takes no action, the State may issue the permit to the source. If EPA objects, the State must revise the proposed permit, and if the State fails to do so, EPA must issue (or deny) the permit.

The permit must contain all of the source's pollution control obligations under the SIP and other Clean Air Act requirements. Sources will be required to submit reports to the State concerning the extent of their compliance with their permit obligations. The permit and these reports will be available to the public. The permit may have a life of no longer than five years, after which it may be renewed.

As discussed below, the new permit program includes special provisions, and grants EPA regulatory discretion in certain areas, in order to facilitate administration of the permit system and; in certain circumstances, to shield sources from unwarranted penalties. For example, sources that properly submit permit applications will be protected against penalties for failure to have a permit if issuance of the permit is delayed for reasons beyond the control of the source.

DISCUSSION

Sources Subject to Permit Requirements.—This section adds a new section 350 to the Act and defines the sources that are covered by the new permit program and are required to obtain operating permits. These sources are, in general, those subject to air pollution control requirements under Federal law. These include:

—"Major" sources of pollutants for which national ambient air quality standards have been set, for example, sources that emit volatile organic compounds, NO_x, particulate matter or other regulated pollutants.

—"Major" and "area" sources of hazardous pollutants regulated under section 112 of the Act.

—Sources covered by New Source Performance Standards ("NSPS") under section 111 of the Act (as well as existing sources covered under section 111(d)).

—New sources permitted under the prevention of significant deterioration requirements of part C of the Act.

—New major sources permitted under the new source review requirements of part D of the Act.

—Sources subject to the acid deposition requirements of title IV of the bill.

New and modified major sources are already required to obtain construction permits under the New Source Review and Prevention of Significant Deterioration provisions of the current Act. EPA should avoid imposing additional construction permit requirements under title V. Thus, construction permits may continue to be issued under the existing provisions of the Act, but title V will apply with respect to existing source requirements not otherwise required in the construction permit, e.g., fees.

EPA may require that additional sources obtain permits and the Agency is authorized to exempt sources from the new permit program if the exemption would be consistent with the Act's purposes. For example, EPA may exempt certain small but numerous sources from the requirement to obtain a permit if a reasonable alternative is developed.

State Permit Program.—New section 351(b) of the Act requires EPA, within one year of enactment, to promulgate regulations detailing the requirements for State air permit programs. Approximately 35 States already impose an operating permit requirement in some form. Therefore, EPA's regulations should, to the greatest extent practicable, account for, and provide continuation of these programs. The regulations shall establish the minimum requirements that must be incorporated by all State programs, while, at the same time, providing flexibility to States in developing the remainder of their program components, including the design of reasonable permit issuance procedures. This approach should limit disruption of existing State programs. Existing state permit programs are to remain in place until the new or revised programs, as required under this Act, are in place.

Under new section 351(d) of the Act, each State is required to submit, within three years of enactment of the bill, a permit program for EPA's approval. A State may authorize a local pollution control agency to implement the permit program; however, the State must submit the program to EPA for approval, and must retain overall responsibility for implementing it should the local agency fail to do so. This allocation of responsibility shall operate in the same manner as under new section 110(c)(5)(C) (concerning SIPs) of the Act. In addition, two or more States may form an interstate permitting authority.

The bill sets out, in new section 351(b) of the Act, the minimum requirements, modeled after the Clean Water Act, that the air permit program must meet. The program must provide for the issuance of permits, for a period no longer than five years, that incorporate the requirements of the Act (including SIP requirements) that are applicable to the source. EPA must issue regulations concerning a standard application form reflecting criteria to be developed by EPA (which may take the form of minimum information to be included in permit applications). In addition, regulations must allow adequate procedures for public notice and comment as well as for making the permit application and the permit publicly available (subject to safeguards designed to protect confidential business information, as discussed below).

State programs must require sources to conduct monitoring and to provide compliance reports in accordance with EPA regulations. EPA requirements for monitoring and recordkeeping should be appropriate for the underlying pollution control requirement and its enforcement. As an example, in the case of surface coating facilities subject to a pollution limit expressed in terms of the quantity of ozone precursors contained in the paint or other surface coating material, a requirement for emissions monitoring may not be appropriate. Similarly, emissions monitoring for fugitive emissions may be inappropriate if the pollution control limit is expressed in terms of a work-practice standard. On the other hand, periodic reporting of solvent content and coating usage may be necessary to assure compliance and facilitate enforcement. EPA must require reasonable monitoring and reporting requirements that are adequate to assure compliance.

In addition, in an expansion of existing requirements under existing section 110(a)(2)(K), State permit programs must include permit fees designed to recoup the costs of the air pollution control program. These fees are in addition to fees required in other portions of the bill.

The purpose of this requirement is to force sources of pollution to internalize the cost of such pollution including the costs incurred by the States in developing and implementing air pollution control programs. Thus, States must charge permitted sources for the costs of permit issuance, including, for example, costs associated with processing the permit application and enforcing the terms of the permit; the source's share of the costs of, among other things, conducting air basin-wide emissions inventories and ambient monitoring, preparing modeling and demonstrations of air basin-wide attainment of the air quality standards; and preparing regulations to control sources subject to the permit requirement, as well as the source's share of overhead costs allocable to those activities. Fees must be charged to support the development of any programs under which the State assumes responsibility for implementing the new source performance standards under section 111 of the Act or the hazardous air pollutant standards under section 112 of the Act.

EPA should grant the States some latitude in designing the specifics of the fee system, such as the basis for the fee asssessment (e.q., the amount of emissions), and the time and manner of assessing the fees (e.q., States may require the fee to be paid at or before the time a permit application is submitted, on an annual basis thereafter, on a fee-for-service basis, or some combination thereof).

However, State programs must recoup, at a minimum, an amount equal to $25 per ton of regulated air toxics and criteria pollutants, except for ozone precursors (including oxides of nitrogen), PM-10 and PM-10 precursors, as well as carbon monoxide. States must use the fees required to be collected, under this title, to support the air pollution control program.

If a State program fails to include an adequate fee program, or if a State fails to collect the required fees, EPA is authorized to collect reasonable fees (e.q., the amount necessary to recover all of EPA's costs associated with imposing controls on the source, or the amount that the State should have collected had it submitted an approvable fee program or had it implemented its approved fee program). EPA may do so regardless of whether EPA or a State (or local) government issues the permit. Penalties and interest may be collected, as appropriate. EPA must use the funds to implement the permit program required under this title. This is in addition to the $15 per ton fee required under new section 173(d) of the Act.

State programs must also provide for adequate personnel and funding to administer the program. In the past, inadequate resources have often prevented States from completely fulfilling their Clean Air Act responsibilities. This requirement, coupled with the fee provisions, is designed to eliminate this serious problem.

Furthermore, state programs may provide for issuing one air permit to a facility with multiple sources of air pollution so long as there is no compromise in the clarity of emissions requirements. Thus, for example, a source with many small emissions points could receive a single air permit specifying any applicable emission limits or work practice standards. However, consistent with the overall principle of maintaining existing State permit programs to the extent possible, and the need for certainty and clarity, EPA may authorize States, if they choose, to issue multiple permits to plants with multiple emission points (although States may not redefine which sources are subject to this title through the issuance of multiple permits).

The issuance of general permits for numerous similar sources within a geographical area is authorized. This provision is designed to reduce the administrative burden on industry and government agencies of permitting large numbers of similar sources that, although small individually, in the aggregate require control.

In addition, for sources that frequently change the locations of their operations, such as asphalt batch plant operators, the bill authorizes permits allowing operation, after notification to the permitting authority, at numerous fixed locations without requiring a new permit at each site. Any such permit must assure compliance at all locations of operation with all applicable requirements of the Act.

EPA Action on State Program Submittal. Under new section 351(d) of the Act, States must submit permit programs within three years after enactment, and EPA must act on States' proposed permit programs within one year from the date of submittal.

Under new section 351(d) of the Act, EPA is authorized to approve or disapprove State programs in whole or in part, and is granted broad discretion in approving part of all of a State submital, even if what EPA approves does not amount to a full State permit program. The rule of *Abramowitz* v. *EPA,* 832 F.2d 1071 (9th Cir. 1987), which precludes EPA approval of parts of SIPs under certain circumstances, does not apply in the case of a permit program. In addition, a State may submit a partial permit program covering one of three specific portions of a complete program: acid deposition, hazardous air pollutants, or other pollutants covered under title I of the Act. New section 351(f) provides that approval of a partial program does not releive a State of the requirement to submit a fully approvable program within the deadlines provided.

If EPA disapproves all or part of a State submittal, EPA must state its reasons and the State must, within 180 days of the date of disapproval, resubmit an approvable program. If the State fails to do so, EPA may apply a construction ban or cut off air grants. EPA may apply a construction ban or cut off air grants. EPA may also promulgate a full or partial permit program for the State by informal rulemaking under the Administrative Procedures Act, 5 U.S.C. 553.

Under new section 351 (g) of the Act, if a permit program submitted by a State substantially, but not completely, meets the requirements of this title, EPA may grant interim approval to the program. Interim approval status may last up to two years. If the State has not submitted approvable corrections to the deficiencies in its permit program by the expiration of interim approval, EPA may promulgate a partial approval and partial disapproval of the permit program.

In addition, under new section 351(h) of the Act, if EPA finds that the permitting authority is not administering or enforcing on approved permit program, EPA may withdrawal approval, apply sanctions, and/or promulgate all or part of a Federal permit program. Although this authority is discretionary, EPA is expected to use it whenever a permitting authority is failing to discharge its responsibilities under the Act.

State Issued Permits.—New section 352 of the Act governs permit applications. Following EPA approval of a State program, the permitting authority must begin the process of issuing permits. As an initial step, under new section 352(c) of the Act, sources are required to submit permit applications six months after EPA approval of the permit program or six months after the date of regulations requiring controls for the source, whichever is later. For example, sources of hazardous air pollutants that are not currently subject to controls under section 112 of the Act would not be required to submit a permit application until six months after the effective date of EPA regulations making such sources subject to controls.

States without operating permit programs and EPA will face an additional workload in acting on these permit applications. EPA estimates that the new permit requirements will cover about 8,200 major sources that emit 100 tons per year or more of criteria pollutants (which are regulated under SIPs). In addition, many smaller sources are (or, as EPA promulgates additional regulations, will be) covered by new source performance standards under section 111 of the Act, hazardous air pollutant standards under section 112 of Act, and nonattainment provisions of this legislation. By comparison, under the Clean Water Act, some 70,000 sources receive permits, including more than 16,000 major sources. Although many air pollution sources have more emission points than water pollution sources, the additional workload in managing the air pollution permit system is estimated to be roughly comparable to the burden that States and EPA have successfully managed under the Clean Water Act.

EPA should seek to minimize problems of processing the large numbers of initial permit applications. EPA and the States should develop streamlined procedures for handling large numbers of permits, particularly in the case of industries whose sources have comparable operations, through, for example, model or standardized permits. EPA should also develop streamlined procedures in cases where the permit simply incorporates without changing, existing requirements found in the SIP or in other provisions of the Act.

Under new section 352(b) of the Act, the permit application must include a schedule of compliance that describes what steps the source will take to come into compliance with the applicable requirements and to fulfill obligations with respect to penalties.

New section 352(c) of the Act requires that the permit application be signed by a responsible corporate official, as defined by EPA, who must identify the requirements applicable to the source, and certify that the information contained in the permit application is accurate.

Permit applications, as well as the permits and monitoring or compliance reports, must be made available to the public under new section 352(e) of the Act. However, if a permit applicant is required to submit confidential business information entitled to protection as a trade secret, the applicant may submit such information in a confidential supplement to the application, which will be handled under section 114(c) of the Act. Confidentiality should be denied, however, when the information is necessary to establish permit limitations, as under *Natural Resources Defense Council* v. *EPA*, 822 F.2d 104, 120 (D.C. Cir., 1987).

In some cases, permit applications will simply incorporate information necessary to satisfy the requirements of existing SIPS or other Act requirements. 4Preparation of the permit applications will not involve significant new costs. For example, this title does not independently require source-specific modeling or monitoring. EPA should seek to develop streamlined permit application procedures to the extent necessary to reduce application costs, especially for small sources. As noted above, these procedures would be particularly appropriate in the case of industries whose sources have comparable operations (in which case EPA and the States should attempt to develop model or standardized permits).

Penalties for failure to have a permit under new section 352(d) of the Act shall not apply to sources that submit a timely and complete permit application. This "permit application shield" will safeguard sources in the event delays in processing permit applications occur (although it will not protect sources from penalties for failure to comply with other Act requirements). EPA and the States shall develop reasonable administrative procedures, such as a checklist for completeness, that will facilitate determinations as to whether and when a permit application is complete. The "permit application shield" does not apply to those permit applications that have been submitted in an incomplete form or in an untimely fashion.

After receiving the permit application, new section 353 of the Act requires the permitting authority to prepare a draft permit and provide an opportunity for EPA and the public to comment on the draft, including an opportunity for an informal public hearing.

Under new section 354 of the Act, contiguous States that may be affected by emissions from another state, must be notified by the permitting authority of such other state as to each permit application and each permit the permitting authority proposes to issue. The contiguous States may submit written recommendations on issues of concern, such as the impact on air quality. If the permitting authority does not accept any significant recommendation, it must respond in writing to the contiguous State and the EPA. EPA will then consider the contiguous State's recommendations in the course of its review of the proposed permit.

The purpose of this provision is to assure that emissions from a source in one State do not interfere with another State's efforts to meet the Act's requirements, for example, by contributing to violations of national ambient air quality standards. This provision, in conjunction with the amended section 126 of the Act should minimize interstate air pollution problems that are not being adequately addressed under existing implementation of the Act. EPA is authorized to develop reasonable requirements that will limit involvement in the permitting process to only those contiguous States that may be affected by a source's emissions. EPA should develop reasonable procedures so that the involvement of contiguous States does not lead to unwarranted delays in permit issuance.

Permit Requirements and Conditions.—Under new section 353 of the Act, the permits issued by the permitting authority must describe all of the source's obligations under the Act. Subsection (c) provides that these may include emission limitations; standards; a schedule of compliance; requirements for conducting monitoring and analyses, as well as providing for inspection, entry, monitoring and reporting; and providing for public access to this data. The permit must also provide for periodic progress reports with respect to the compliance plan, as well as periodic reports concerning compliance with the permit requirements. EPA is authorized to promulgate reasonable reporting requirements, which should be no more detailed than necessary to assure adequate compliance. The reports submitted by the source must be signed by a responsible corporate official, who must identify the requirements applicable to the source and certify that the source has complied with them (or else identify any noncompliance).

In general, subsection (g) provides that once a permit is properly issued to a source (following the expiration of EPA's review period), the permit becomes a comprehensive statement of the source's Act obligations. Upon timely and complete application, the source is shielded from penalties for failure to meet the requirement to obtain a permit.

Permit Modifications.—Permits must be renewed no later than five years after issuance and may be revised sooner if, for example, the source or the State seeks changes. The same procedures apply to permit renewals as apply to initial permits. EPA may require, under the State program, a shorter renewal period if this is consistent with State practice.

EPA should seek to develop administrative mechanisms to alleviate the burdens of permit renewals on sources preparing permit applications and on permitting authorities required to act such applications. EPA should also develop administrative mechanisms or guidance so that a source may, in the course of normal operation, make minor changes in production methods or products without the need to apply for a modified permit with each change. For example, EPA guidance on permit drafting could allow a source's pollution control requirements to be specified in a permit for existing as well as anticipated processes or product lines to be utilized. Thus, the use of any such process or product would not trigger the need for a permit modification. Similarly, the source's pollution control requirements could be expressed in terms of a well-defined range of operating parameters, so that changes within those parameters would not trigger the need for a permit modification.

The burden of obtaining a revised permit is much more manageable than obtaining a SIP revision, as required by current law. For sources covered by the acid deposition program, under new title IV of the Act, permits may contain a general provision prohibiting those sources from emitting sulfur dioxide in excess of the allowances held by the source. Therefore, when allowance trades occur, the trades will not, in themselves, require revisions to the permits. Permits would need to be revised, however, if a source seeks to increase its permitted emission rates in order to take advantage of increased allowances it may acquire.

Except under narrow circumstances, section 353(f) provides that a permit may not be issued or revised in a manner that results in a relaxation from the previous permit, the applicable implementation plan, or any federal requirement under the Act. Such a relaxation is allowed only if the applicant demonstrates that the relaxation is consistent with any attainment demonstration, progress requirement, or new source permit requirement, and does not interfere with any other requirement under the Act. The applicant must also demonstrate that the existing limitation is not appropriate because changes occurred at the source, new information became available, the existing limitation resulted from a mistake, or the permittee demonstrates, in accordance with procedures prescribed by EPA, that it is unable to achieve the emissions limitation notwithstanding the proper installation, operation, and testing of all required controls. Under no circumstances, however, may a permit be revised to contain emission standards less stringent than the applicable standards under sections 111 or 112 of the CAA.

In addition, the State may modify (or terminate) the permit for cause, as determined by EPA in its discretion through regulations (or in the context of EPA approval of a State permit program). If EPA finds that cause exists to modify (or terminate) the permit, it shall notify the State and the source, and the State must respond appropriately. If the State fails to do so, EPA shall modify (or terminate) the permit.

Delays in permit renewals should not adversely affect the sources. For EPA issued permits, the Administrative Procedure Act provides that an application for a renewal permit automatically extends the existing permit. Many States have similar laws. EPA regulations should provide that if a State does not wave such authority, it must include it in its program submitted to EPA for approval.

EPA Review of Proposed Permits.—After the permitting authority reviews the permit application and any material submitted by the public, EPA, or other States, it must issue a proposed permit (or deny the permit), and forward it to EPA for review. Under new section 354(b) of the Act, EPA has 90 days to object to and, thereby, veto the proposed permit issuance; if EPA fails to object, the permit may be issued in the form sent to EPA.

The 90-day veto is patterned after provisions of the Clean Water Act, which have proved to be a successful means of ensuring EPA oversight over State permit issuance, without being overly intrusive into the States' affairs. Under the Clean Water Act (as well as the new source review provisions of the Act), in many cases, EPA has avoided possible disputes with the States by providing comments on a particular permit application before the State drafts the proposed permit, *e.g.*, before or during the public comment process. As a result, as a practical matter, EPA has applied the veto rarely in the context of the Clean Water Act. However, the presence of the veto maintains EPA's authority and responsibility to assure that permits meet statutory requirements. EPA should work with the permitting authorities during the permit issuance process, to the extent practicable, and EPA should provide adequate guidance and training to minimize the need for any vetoes. The intent of this section is to assure that permits meet minimum Act requirements, not to rewrite them at the Federal level.

New section 354(d) authorizes EPA, by regulation (or in the context of acting on individual State permit programs), to waive its authority to review permits for classes or categories of sources. EPA should explore development of reasonable administrative procedures to minimize or eliminate the need for EPA review with respect to, among other things—

(1) classes or categories of sources (including classes or categories in different States) for which permit by permit review has been shown to be unnecessary;

(2) classes or categories of sources for which EPA and the States have developed model or standardized permits; and

(3) permits (including renewals) that simply incorporate existing SIP or other Act requirements.

If EPA objects to a proposed permit sent in by the permitting authority, now section 354(e) of the Act requires the permitting authority to resubmit the proposed permit within 90 days after receipt of such objection, taking account of EPA concerns. If the permitting authority fails to do so, or if it resubmits a proposed permit to which EPA again objects, EPA is required either to issue a permit or to formally deny a permit for that source. In addition, EPA has authority to impose appropriate sanctions against the State if EPA finds that the State action rises to the level of failure to implement the permit program. EPA does not have authority to issue permits under this title prior to approval or disapproval of a State permit program.

Sources or citizen groups that object to a State-issued permit may challenge the permit in State court. In addition, if EPA has issued (or formally denied) the permit, sources or citizens may challenge the EPA action under section 307(b) of the Act. However, permit decisions may not be challenged in civil or criminal enforcement proceedings. This pattern to judical review is identical to that under the Clean Water Act permit system.

Relation to Other Authority.—The bill clarifies that State authority to establish additional permitting requirements not inconsistent with the Act is preserved. In particular, the bill does not preclude States from including additional permitting conditions that may be enforceable only at the State or local level. For example, the State may impose air toxics requirements that are not part of the SIP or any section 112 standard. The bill also specifies that this title is not intended to authorize any State or EPA to modify or revoke any requirement of the acid deposition title of this Act, including allowances granted under that title.

TITLE VI—ENFORCEMENT AND REAUTHORIZATION

INTRODUCTION

Title VI of the bill addresses a broad range of issues relating to enforcement of the Act. Among its chief provisions, this title broadens the scope of activities that can be the subject of civil or criminal sanctions and penalties by eliminating the current Act's references to specific sections, and by substituting more general references to separate titles in the Act.

In addition, the title establishes criminal liability for unlawful releases of toxic pollutants, including negligent releases of those pollutants.

Title VI also creates a new administrative citation authority under which EPA can assess administrative penalties of up to

$200,000 in any any given case. In this connection, this title authorizes EPA to use administrative subpoenas in aid of its administrative enforcement activities.

This title of the bill enhances the ability of the Environmental Protection Agency to identify facilities that are violating the requirements of the Act by clarifying that EPA has the power to require all facilities to provide certifications of compliance with respect to specific emissions limitations, and also by making clear that the Agency may rely upon any credible evidence of violations in pursuing alleged violations.

Title VI authorizes the courts to impose civil penalties in citizen suits, and directs that any such penalties will be deposited in a separate fund within the United States Treasury to be used by the EPA in furtherance of air pollution control activities.

Finally, the title clarifies that citizen suits may be brought to compel action by EPA where that action has been unreasonably delayed or withheld. It provides that citizen suits to compel the EPA to act can be brought in the Federal district courts. It further provides that EPA shall respond promptly to petitions for administrative action.

SECTION 113 ENFORCEMENT (SECTION 601)

SUMMARY

Section 601 of the bill amends section 113 of the Act in the following ways:

Amendments to section 113(a).—First, the bill expands the scope of activities subject to administrative, civil, or criminal enforcement activity by eliminating the specific references to other sections of the Act that currently are set out in section 113(a)(3), and by substituting a more general authorization for the Administrator to issue an administrative order or to bring a civil, or a criminal, action with respect to any violation of requirements contained in titles I, III, and IV of the Act. The failure to pay any fee owed to the United States under the Act is added as a violation that can be the subject of an administrative order or a civil, or criminal, action initiated by the Administrator.

Second, the bill provides that compliance schedules established in orders issued under section 113(a) of the Act are limited to no more than one year in duration. These orders would be non-renewable, and would not prevent the EPA or the affected State from assessing penalties or from taking other enforcement actions under the Act. Nor would they affect any person's obligations to comply with applicable permits or implementation plans.

Third, the bill broadens the current authority of EPA by prohibiting the operation, as well as the construction or modification of any major stationary source and by allowing the Agency to issue an order with respect to such sources in a State whenever EPA finds that the State is not in compliance with "any requirement of the Act" relating to the construction of new sources or the modification of existing sources. In addition, the bill authorizes the EPA to issue an administrative penalty order under these circumstances.

Amendments to section 113(b)—First, the bill expands the current authority of EPA to take enforcement actions under section 113(b) of the Act by deleting the references to specific sections of the Act and replacing those references with language authorizing EPA to seek injunctive relief or civil penalties whenever any owner or operator of a major stationary source or major emitting facility violates any requirement of an applicable implementation plan or violates "any other requirement" of titles I, III, or IV of the Act, including requirements for the payment of fees. In addition, the bill empowers the Administrator to seek injunctive relief or civil penalties against any person who attempts to operate a major stationary source in any State where EPA has found that the State is not in compliance with its SIP with respect to the construction of new sources or the modification of existing sources.

Second, with respect to jurisdictional matters in existing section 113(b) of the Act, the bill authorizes Federal district courts to collect any fees owed under the Act, and to award "any other appropriate relief" when considering whether to provide injunctive relief or to impose civil penalties.

Third, the bill transfers and expands upon the existing language in section 113(b) of the Act that provides guidance for the court in determining the amount of any civil penalty. It deletes the existing language on this subject from section 113(b), and creates a new subsection of the Act, section 113(e), to address the issue.

Amendments to section 113(c).—The bill substantially rewrites section 113(c) of the Act, pertaining to criminal enforcement, in a number of respects.

First, the bill provides criminal penalties for any person who knowingly fails to pay "any fee owed the United States under titles I, III, or IV" of the Act.

Second, the bill provides criminal penalties for any person who negligently places another person in imminent danger of death or serious bodily injury by negligently releasing into the air (i) any hazardous air pollutant listed under section 112 of the Act or (ii) any extremely hazardous substance listed pursuant to 42 U.S.C. 11002(a)(2). Criminal fines authorized under this provision are to be set in accordance with title 18 of the U.S. Code. In addition to fines, the section provides for up to one year in prison per day for each violation.

Third, the bill provides that any person who *knowingly* releases into the air any hazardous air pollutant listed under section 112 of the Act, or any extremely hazardous substance listed pursuant to 42 U.S.C. 11002(a)(2), and "who knows at the time that he thereby places another person in imminent danger of death or serious bodily injury" shall be subject to more severe criminal penalties, including imprisonment for a term of up to 15 years for each violation. The section provides the following guidance in determining whether a person "knew" that the violation placed another person in imminent danger: (i) the defendant will be responsible only for actual awareness or actual belief possessed; (ii) knowledge possessed only by a person other than the defendant will not be attributed to the defendant; (iii) circumstantial evidence can be relied upon to prove actual knowledge on the part of the defendant, "including evidence that the defendant took affirmative steps to be shielded from relevant information". A knowing release of these pollutants does not constitute a violation under this provision if the release does not violate an emission standard that has been set for that pollutant. The term "person" is defined to include "any responsible corporate officer".

Fourth, the bill provides criminal fines and imprisonment for "any person who knowingly violates any requirement or prohibition of titles I, III, of IV" of the Act.

Fifth, the bill expands the scope of actions that can be the subject of criminal penalties by clarifying what constitutes misrepresentation or omission of material data required to be filed or maintained under the Act. In addition, the bill increases the allowable term of imprisonment for tampering with monitoring devices or methods, for failing to notify or report as required, and for making false statements, representations, or certifications, as well as for omitting material information and for similar conduct. The current term of six months is increased to two years.

Amendments to section 113(d).—The bill deletes existing section 113(d) in its entirety. In its place, the bill establishes a new system for assessing civil penalties by means of an administrative process.

First, the bill authorizes EPA to assess civil administrative penalties of up to $25,000 per day whenever it finds that any person has violated any requirement of an applicable implementation plan, or has violated "any other requirement of titles I, III, or IV" of the Act, or is attempting to construct, modify, or operate a major stationary source in a State where EPA has found that the State is not complying with the Act's requirements relating to such activities. The bill provides that these administrative penalties cannot exceed $200,000 for any particular violation. These penalties are limited to violations that are alleged to have begun no more than twelve months prior to the assessment. The section further provides for a hearing on the record in accordance with title 5 of the United States Code, sections 554 and 556, in connection with the order assessing the administrative penalty.

Second, the bill authorizes EPA to establish a "field citation program" for minor violations of the Act. Penalties under this program are limited to $5,000 per day for each violation. Any person to whom a field citation is issued can request a hearing. Any such hearing would not be subject to the requirements of title 5 of the United States Code, sections 554 and 556.

Third, the bill provides for review of EPA administrative penalties in Federal district court. The section further provides that an EPA order assessing administrative penalties will not be set aside unless in any particular case the court finds that there is not substantial evidence to support the order, or unless the penalty assessment constitutes an abuse of discretion.

Fourth, the bill directs EPA to recover its administrative penalty and field citation assessments in Federal district court whenever the person against whom the assessments are made fails to pay. The bill provides that the validity, amount, and appropriateness of the penalty shall not be subject to review in such actions. The bill further provides that the United States is entitled to recover its enforcement expenses and an additional non-payment penalty from persons who do not pay the assessments on a timely basis.

Amendments to section 113(e).—The bill deletes existing section 113(e) from the act in its entirety, and in its place substitutes a new provision that sets out criteria for determining the amount of any penalty to be assessed under the Act.

First, the bill introduces several new criteria for penalty assessment, including the violator's compliance history, the duration of the violation as established by any credible evidence, and the economic benefit of noncompliance.

Second, the bill provides that for purposes of determining the number of days of any given violation,

> the violation shall be deemed to commence on the first provable date of violation and to continue each and every day thereafter until the violator establishes that continuous compliance has been achieved, except to the extent that the violator can prove by a preponderance of the evidence that there were intervening days during which no violation occurred or that the violation was not continuing in nature.

DISCUSSION

Liability for violations of the Act.—The bill amends section 113 of the Act to impose civil and criminal liability for violation of any requirement, prohibition, permit, rule or order issued under titles I, III, and IV. These amendments fill an important gap in the Act, which currently does not subject the violators of any significant regulations and orders to criminal and civil sanctions. Examples of such gaps are sections 167 and section 303 orders. This amendment is modeled after similar provisions in other environmental statutes, including the Toxic Substances Control Act (TSCA), 15 U.S.C. sections 2614 and 2615(b) (criminal penalties for, inter alia, failure or refusal to comply with "any rule promulgated or order issued . . ." or with "any requirement prescribed by . . ."); the Resource Conservation and Recovery Act (RCRA) section 3008, 42 U.S.C. section 6928 (administrative orders or civil action for "appropriate relief" for violation of "any requirements of this subchapter"); and the Marine Protection, Research and Sanctuaries Act, 33 U.S.C. section 1415 (civil, criminal and administrative liability for violations of, inter alia, regulations promulgated under the Act).

Notice of violation.—Section 113(a)(1) of existing law requires the Administrator to notify the State and the person in violation of a State implementation plan of EPA's finding of a violation 30 days before initiating a civil enforcement action. Section 113(a)(1), as amended, clarifies and confirms that the 30-day notice provision is intended solely to allow the State an opportunity to take appropriate action. The notice period does not, and never was, intended to require that EPA show the source to have been in continuous violation for 30 days. Many violations of the Act are sporadic or intermittent. Proving that a source has been in continuous violation of the Act for 30 days would require constant (and expensive) monitoring by EPA, and might be impossible in some cases in which enforcement is nevertheless appropriate.

Nor is the notice provision intended to suggest that only violations that continue after the data notice has been provided are subject to enforcement actions. See *U.S.* v. *Louisiana-Pacific Corp.*, CA No. 86–A–1880. (D. Colo. March 22, 1988) (rejecting the argument that the 30-day notice provision relieves defendents of liability for penalties during and preceding the 30-day period). The 30-day notice is not a shield to protect sources, but rather ensures that the States will have an opportunity to exercise their enforcement prerogatives under the Act prior to initiation of a Federal enforcement action.

Section 113(b)(2) of current law (redesignated subsection 113 (b)(1)) is likewise amended to clarify that a source is not entitled to 30 penalty-free days, nor to a repeat of the violation, before becoming subject to enforcement action.

Duration of administrative orders.—Section 113(a)(4) of the Act is amended to clarify and conform that the Administrator may issue judicially enforceable, non-renewable compliance orders which require a source in violation to come compliance as expeditiously as practicable, but no later than one year after issuance of the order.This authority is consistent with the objectives of the Act, as well as with other statutes which authorize the issuance of compliance orders with "reasonable" compliance schedules. See, e.g., the Clean Water Act (CWA), 33 U.S.C. section 1319(a)(5)(A), and the Resource Conservation and Recovery Act, 42 U.S.C. section 6928(a)(1).

Until now, EPA has been constrained to limit the duration of administratevily-issued compliance schedules to nor more than 30 days as a result of other provisions of the Act, such as sections 110 (i) and 113(d). Often, remediation cannot occur within 30 days after issuance of the schedule. EPA is, therefore, often forced to commence a judicial enforcement action under section 113(b), with the concomitant delay and expense, in order to obtain a compliance schedule of longer duration. Limiting administrative compliance schedules to no more than one year will protect against the use of this authority as a means of extending compliance deadlines. In addition, EPA retains the authority to seek longer schedules from the courts, and to subject sources to penalty actions, contractor listing, and other sanctions until they come into compliance.

Criminal sanctions.—First, the bill replaces language in existing section 113(c) that sets forth a specified maximum criminal penalty with a reference to title 18 of the United States Code. Title 18 provides a schedule of fines based on a number of factors, including the nature of the defendant and whether the crime is a misdemeanor or a felony. See, 18 U.S.C. section 3571. This amendment is intended to encourage uniformity of penalties among criminal laws and to give judges and prosecutors a guide with which they are already familiar. The amendment is consistent with recent amendments to other environmental statutes, including the following: section 1423(b)(2) of the Safe Drinking Water Act, 42 U.S.C. section 300h–2(b)(2); section 4109(c) of the Shore Protection Act of 1988, Pub. L. 100–688, 102 Stat. 4154 (November 19, 1988) (codified at 33 U.S.C. section 2609(c)); section 103(b) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. section 9603(b).

Second, by elevating criminal sanctions for knowing violations of the Act from the misdemeanor to the felony level, the amendments conform the Act to the provisions of other environmental laws, including the following: section 309(c)(2) of the Clean Water Act, 33 U.S.C. section 1319(c)(2); section 3008(d) of the Resource Conservation and Recovery Act, 42 U.S.C. section 6928(d). Such increased sanctions should provide a useful deterrent against violations of the Act.

Third, the bill confirms each paragraph in section 113(c) of the Act to other environmental laws by doubling the allowable term of imprisonment and fines for violations committed after the first offense.

Fourth, the bill adds a new section 113(c)(1), providing that knowing violations of the Act's fee provisions constitute misdemeanors.

Fifth, the bill amends section 113(c)(2) (redesignated as section 113(c)(4)) by adding criminal liability for knowing omissions of material information, knowing failures to take required actions, and knowing alterations of monitoring devices. Such liability is especially important for self-monitoring statutes like the Clean Air Act. EPA's ability to oversee the regulated community under the Act is dependent to a large degree upon compliance by each source with reporting, record-keeping, and monitoring requirements. This amendment conforms the Act to several provisions in other environmental laws, including: section 3008(d)(3) of the Resources Conservation and Recovery Act, 42 U.S.C. 6928(d)(3) (felony sanctions for knowing omissions, and for failure to file required documents); section 309(c)(4) of the Clean Water Act, 33 U.S.C. 1319(c)(4) (felony sanctions for knowing false statements, as well as for misrepresentations and tampering); section 103(b) of the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. 9603(b) (felony sanctions for failure to notify the government of releases of hazardous substances and for knowing false statements contained in such notifications). This provision covers only acts and omissions that are both knowing and material. "Material" omissions are omissions that will have a tendency to influence action or inaction by the EPA; thus this provision will not apply to incidental or insignificant omissions. Similarly, the requirement for a "knowing" violation in this context will ensure that failures to file or incomplete filings that are traceable to good faith mistake or to accident or inadvertence will not be subject to this provision.

Sixth, the bill adds a new section 113(c)(5), a knowing endangerment provision that conforms the Act to other recently reauthorized environmental statutes. *See*, section 309 of the Clean Water Act, 33 U.S.C. 1319(c)(3); section 3008 of the Resource Conservation and Recovery Act, 42 U.S.C. 6928(e) and (f). Section 113(c)(5) authorizes felony sanctions against any person who knowingly emits a hazardous air pollutant listed under section 112, or who knowingly emits any extremely hazardous substance listed under section 302(a)(2) of the Emergency Planning and Community Right to Know Act (EPCRA), 42 U.S.C. 11002(a)(2), and knows at the time that he thereby places another person in imminent danger of death or serious bodily injury. For purposes of determining whether a violation under this provision was a "knowing" violation, the amendments provide that the person accused of the violation is responsible only for his actual awareness or actual belief possessed, and that knowledge possessed by another person (but not by the accused) may not be attributed to the accused. However, the amendments further provide that circumstantial evidence, "including evidence that the defendant took affirmative steps to be shielded from relevant information," may be relied upon to prove possession of actual knowledge on the part of the accused.

Seventh, the bill adds new section 113(c)(2), a negligent endangerment provision that authorizes misdemeanor sanctions against any person who negligently places another person in imminent danger of death or serious bodily injury by negligently emitting a hazardous air pollutant listed under section 112 of the Act, or who negligently emits any extremely hazardous substance listed under section 302(a)(2) of EPCRA, 42 U.S.C. 11002(a)(2).

With respect to knowing or negligent endangerment prosecutions, the release and the endangerment are separate elements to be proved at trial. The stiff maximum penalties of section 113(c)(5), and the implicit requirement of section 113(c)(2) that sources exercise due care, are particularly appropriate for sources that emit hazardous air pollutants and substances, given the threat they can pose to human health.

Eighth, the bill amends existing sections 113 (a) and (c) to eliminate the provisions requiring EPA to give notice before initiating a criminal enforcement action for violations of an implementation plan. Requiring notice prior to the commencement of a criminal action for environmental violations was a provision that was unique to the Clean Air Act in comparison to other environmental statutes. Such a notice requirement provided an opportunity for violators to frustrate the purposes of the Act by, for example, leaving the jurisdiction or by destroying evidence. The amendments to sections 113(a)(1) and 113(a)(2) clarify and confirm that the 30-day notice provision that is applicable to civil and administrative actions is inapplicable to criminal actions. Furthermore, the amendments clarify that, as is the case with respect to all other environmental statutes, the option to proceed criminally is not precluded by the initiation of an administrative or civil action.

Administrative assessment of civil penalties.—The bill authorizes the Administrator to issue administrative penalty orders. The government should have the flexibility to enforce the Act administratively, in addition to its powers to enforce the Act in court. Administrative enforcement authority is provided in numerous other environmental statutes; it often affords a more expeditious and less costly means for resolving compliance problems. See, the Clean Water Act, 33 U.S.C. 1319(g); the Resource Conservation and Recovery Act, 42 U.S.C. 6928(a); and the Toxic Substances Control Act, 15 U.S.C. 2615. Although section 120 of the Act contains an administrative scheme for recovering the economic benefit of non-compliance, the Act hitherto has lacked any provision for the assessment of penalties administratively.

As a complementary power to the Act's current civil penalty authority, new section 113(d) authorizes assessments of civil administrative penalties up to the same statutory maximum contained in section 113(b) for civil judicial penalties ($25,000 per day for each violation). Administrative penalty assessments are to be calculated using the same criteria specified in section 113(e) for use in section 113(b) court actions. Liability for any administrative penalty will accrue from the first provable date of the violation. However, the amendment sets a cap of $200,000 on administrative assessments for any one violation.

Like the civil judicial penalty provision contained in section 113(b), the peanalty cap in section 113(d) would not limit the Administrator's authority pursuant to section 120 to recover the full economic benefit of noncompliance in cases where such benefit exceeds the maximum statutory penalty. All penalties authorized in section 113 and section 120 continue to be applied separately, and one will not substitute for the other.

The provisions for judicial review and collection of administrative penalties are intended to operate in accordance with the Administrative Procedure Act (APA), sections 554 and 556. Like comparable provisions for administative penalties in the Clean Water Act, the Toxic Substances Control Act, and the Resource Conservation and Recovery Act, regulations should be promulgated to assure that violators are afforded due process protections such as the opportunity to be heard, representation by counsel, and the right of cross-examination.

The Act also is amended to authorize the Administrator to issue "field citations" for minor violations discovered during the course of an inspection, and for violations of routine reporting and recordkeeping requirements. The particular categories of cases that may be addressed by field citations should be promulgated in regulations after consultation with the Department of Justice. Civil penalties assessed in a field citation are to be specified by the regulations and may not exceed $5,000 per day of violation. The payment of a penalty assessed pursuant to a field citation is not a defense to further enforcement and penalty liability should the violation continue. Sources against whom field citations are issued may either pay the fine immediately, or request an informal, non-APA hearing.

Repeal of section 113(d) compliance extensions.—The bill eliminates the existing Act provision for delayed compliance orders in order to simplify enforcement and to eliminate unnecessary administrative burdens on the States and on EPA. Separate provisions in the Act for extending compliance deadlines eliminate the need for delayed compliance orders. For example, section 113(a) of the Act, as amended, authorizes the issuance of administrative compliance schedule orders of up to one year in duration, with longer schedules available through court orders in actions brought under section 113(b). This amendment is prospective in its effect. Any Federally-approved delayed compliance orders that are in force prior to the effective date of this amendment shall remain in force until expiration, modification, or termination of those orders in accordance with their terms, and will not be affected by this amendment.

Penalty assessment criteria.—The purpose of new section 113(e) of the Act is to identify explicitly a uniform set of factors that both the courts and the Administrator shall consider in determining the appropriate amount of any penalty assessed under sections 113 or 304. This amendment also clarifies that the maximum statutory penalty may be assessed for each day of each violation, including each day of a multi-day averaging period, as is allowed under section 309(d) of the Clean Water Act, 33 U.S.C. 1319(d). See, *Gwaltney of Smithfield, Ltd.* v. *Chesapeake Bay Foundation, Inc.,* 791 F 2d

304 (4th Cir. 1986), vacated and remanded on other grounds, 108 S. Ct. 376 (1988).

In addition, once the government, or a citizen in a citizen suit that alleges continuing violations, establishes a *prima facie* case showing a violation of an ongoing nature, the burden of proof would shift to the source to prove by a preponderance of the evidence that it has cured the violation or that the violation was not of a continuing nature and did not recur. Otherwise, and until the date the source establishes that it has come into compliance, the court should presume that the violation was continuous, and should assess penalties for each day of that violation. This shift in the burden of proof is appropriate because the source is in a better position than EPA to establish its compliance status. In this respect, the amendment overrules *United States* v. *SCM Corp.,* 667 F. Supp. 1110 (D. Md. 1987), in which the court refused to shift to the source the burden of proving compliance after EPA established that the source was in violation of the Act.

Finally, the amendment clarifies that courts may consider any evidence of violation or compliance admissible under the Federal Rules of Evidence, and that they are not limited to consideration of evidence that is based solely on the applicable test method in the State implementation or regulation. For example, courts may consider evidence from continuous emission monitoring systems, expert testimony, and bypassing and control equipment malfunctions, even if these are not the applicable test methods. Thus, this amendment overrules the ruling in *United States* v. *Kaiser Steel Corp.,* No. 82-2623-IH (C.D. Cal. January 17, 1984) to the extent that the court in that case excluded the consideration of such evidence.

REVIEWABILITY OF ADMINISTRATIVE ORDERS (SECTION 602)

SUMMARY

Section 602 of the bill amends section 307 of the Act in the following respects.

Amendment to section 307(b)(2).—The bill amends section 307(b)(2) of the Act by providing that orders or notices issued under section 113(a) and several other sections of the Act are not considered final actions for purposes of judicial review. The bill further provides that the enumerated orders, notices, subpoenas and actions shall be subject to judicial review only in enforcement proceedings brought by the United States, or in a citizen suit.

Amendment to section 307(e).—Section 307(e) of the Act is amended by providing that orders or notices issued under section 113(a) and certain other enumerated sections of the Act can only be reviewed in an enforcement proceeding commenced by the United States, or in a citizen suit.

DISCUSSION

In order to ensure more timely correction of air pollution violations, the bill amends section 307 (b)(2) and (e) of the Act, clarifying and confirming that orders issued pursuant to section 113(a), section 167, and section 303, as well as administrative subpoenas issued pursuant to section 307(a) and actions under sections 114, 206(c), and 208, are not "final" agency actions within the meaning of section 307(b)(1). Section 307(b)(1) of the Act grants jurisdiction to the Federal circuit courts of appeal to review "final action" of the Administrator. The term "final action," however, is defined only by a non-exclusive list of particular kinds of actions. Several courts have specifically considered whether section 307(b)(1) provides for pre-enforcement review of administrative orders. See, e.g., *Solar Turbines, Inc.* v. *Seif,* CA No. 88-3178, 88-5591, 88-5623, (3d Cir. June 27, 1989) (section 167 orders are not "final" action; no pre-enforcement review); *Asbestec Construction Services, Inc.* v. *EPA,* 849 F. 2d 765 (2d Cir. 1988) (issuance of section 113(a) compliance order for violation of asbestos NESHAP does not constitute "final action"); *Union Electric Co.* v. *EPA,* 593 F. 2d 299 (8th Cir. 1979) (no pre-enforcement review); *Lloyd A. Fry Roofing Co.* v. *EPA,* 554 F. 2d 885 (8th Cir. 1977) (no pre-enforcement review).

Any judicial review of administrative orders may be carried out only at the time the government or another person seeks to enforce such orders. Otherwise, enforcement for violations of the Act could be delayed indefinitely pending judicial review in the Federal courts of appeal. The cases cited immediately above emphasize that this clarification comports with the goals of the Act. EPA must possess the ability to proceed expenditiously against violators. Allowing immediate review of an administrative order in a court of appeals would significantly delay enforcement, and could suspend correction of the underlying violation for years. This is particularly true in cases where a district court defers a decision pending a ruling by the court of appeals. Equally undesirable is the prospect that courts at both the district court and court of appeals levels might decide to consider the same issue at the same time. In short, delays resulting from the pre-enforcement review of administrative orders not only conflict with the statutory directive that air pollution be prevented in an expeditious fasion, but it also hinders the ability of EPA to protect the public from the environmental hazards associated with air pollution.

Since a violator may contest the validity of an administrative order in an enforcement action, defining "final action" to exclude the issuance of an administrative order does not create an undue hardship for defendants. Although a violator risks the imposition of section 113(b) penalties for noncompliance with an administrative order, due process would be satisfied for the reason that the imposition of a penalty rests within the discretion of the court. *Wagner Seed Co.* v. *Daggett,* 800 F. 2d 310 (2d Cir. 1986). In other words, the threat of a penalty is not deemed to be so severe as to deny a violator the choice to disobey an order and challenge it in such cases, if any, will be based upon the legitimacy of the order, among other factors.

This amendment will also promote judicial economy. At present, the burdens on Federal appellate courts are significant. Given the fact that many challenges to administrative orders involve factual questions, district court review in an enforcement proceeding is the better forum than is review in the courts of appeals.

COMPLIANCE CERTIFICATION (SECTION 603)

SUMMARY

Section 603 of the bill amends section 114 of the Act in several respects, and also amends section 307 of the Act.

Amendments to section 114(a)(1).—The bill amends section 114(a)(1) of the Act by providing EPA the authority to require additional monitoring measures and audit procedures.

Amendments to section 114(a).—The bill amends section 114(a) of the Act by requiring EPA to obtain "compliance certifications" from owners or operators of major stationary sources, and by authorizing EPA to obtain such certifications from any other person. The bill provides that these certifications shall include a description of the compliance status of the source that is the subject of the certification, along with a statement as to whether compliance is continuous or intermittent. The bill further provides that these certifications, and any monitoring data, shall be public information.

Amendment to section 307(b)(1).—The bill amends section 307(b)(1) of the Act by providing that petitions for judicial review of regulations for implementing section 114(a) shall be filed in the United States courts of appeals.

DISCUSSION

Under the current implementation of the Act, EPA typically determines the compliance status of sources by conducting on-site inspections, or by issuing source-specific investigatory letters requiring the collection and submission of emission data. The purpose of this amendment is to clarify and confirm that the Administrator has the authority under section 114(a) to require enhanced monitoring and submission of compliance certifications. The amendment requires such enhanced monitoring and compliance certifications from major stationary sources. In appropriate cases, enhanced monitoring may include the use of continuous emission monitoring systems. In addition, this amendment clarifies that EPA may require groups or classes of sources to collect emissions data and to certify their compliance to EPA on an intermittent, periodic, or ongoing basis.

This new authority will be implemented by EPA through regulations or implementation plan and permit program requirements, in addition to its investigatory authority. Reports and certifications might include information on the quantity of emissions of various pollutants, the source's compliance status, the emissions standard that the source deems applicable, and methods the source employs for determining its compliance status. Compliance certifications will further the objectives of the Act for the reason that they would assist both EPA and the sources in identifying and agreeing on applicable compliance requirements at an earlier stage, thereby reducing noncompliance resulting from misunderstandings of the regulatory requirements. Similar to the reporting requirements of the Clean Water Act, 33 U.S.C. 1342, compliance certifications and emission data submitted pursuant to this authority will facilitate enforcement, due in part to the fact that such data and certifications can be used as evidence. Sources are subject to criminal sanctions for any false statements, omissions, and misrepresentations contained in their submissions.

CONTRACTOR INSPECTIONS (SECTION 604)

SUMMARY

Section 604 of the bill amends section 114 of the Act in two areas:

Amendments to section 114(a)(2).—The bill amends section 114(a)(2) of the Act by empowering contractors authorized to act as representatives of the EPA to enter and inspect facilities to determine compliance with the Act.

Amendments to section 114(c).—Section 114(c) of the Act is amended by providing that any authorized representative of EPA, including contractors authorized to act as representatives of EPA, shall be considered employees of the United States for purposes of 18 U.S.C. section 1905. The section further allows authorized EPA representatives to disclose information to other authorized EPA representatives and to State officials.

DISCUSSION

This amendment clarifies and confirms that contractors may be authorized as representatives of EPA for the purpose of conducting inspections under the Act. The large and varied number of sources subject to regulation under the Act, coupled with the relatively limited number of EPA employees available to perform monitoring and inspections, make it inevitable that EPA employ contractors as inspectors. Inspections under the Act frequently require specialized knowledge of particular processes. Thus, the decision of the Ninth Circuit Court of Appeals in BUNKER HILL Co. v. *EPA,* 658 F. 2d 1280 (9th Cir. 1981), that upheld EPA's discretionary use of contractors as authorized representatives was proper, and the decisions in *United States* v. *Stauffer Chemical Co.,* 684 F. 2d 1174 (6th Cir. 1982), *aff'd on other grounds,* 464 U.S. 165 (1984) and *United States* v. *Stauffer Chemical Co,* 647 F. 2d 1075 (10th Cir. 1981) were not. This amendment is modeled after the provisions contained in section 308(a)(4)(B) of the Clean Water Act, 33 U.S.C. 1318(a)(4)(B). A reference to title 18, section 1905, is included to ensure that contractors will be subject to the same criminal liabilities for unauthorized disclosure of trade secrets as are EPA employees.

ADMINISTRATIVE ENFORCEMENT SUBPOENAS (SECTION 605)

SUMMARY

Section 605 of the bill amends section 307 of the Act by including "any investigation, monitoring, reporting requirement, entry, compliance inspection, or administrative enforcement proceeding under the Act" as activities for which EPA can issue subpoenas for witnesses and for documents.

DISCUSSION

This amendment clarifies and confirms that EPA has the authority to issue administrative subpoenas in support of its enforcement or regulatory activitiers under the Act. In addition, the amendment supplements the existing authority to issue subpoenas in support of rulemaking activities to include subpoenas in support of administrative compliance actions. This strengthened subpoena authority is necessary to implement the increased administrative enforcement authority provided elsewhere in the bill, and is consistent with the authority contained in the Toxic Substances Control Act, 15 U.S.C. 2610(c), and the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. 9609(a)(5).

Emergency Orders (Section 606)

SUMMARY

Section 606 of the bill amends section 303 of the Act by substituting the term "public health or welfare, or the environment" for "the health of persons" wherever the latter term appears, and by deleting the reference to inaction by local or State authorities as a precondition for EPA action. The bill also deletes the last two sentences in section 303, as well as all of subsection 303(b).

DISCUSSION

These amendments to section 303 of the Act, as well as parellel amendments to section 113, have several purposes. the amendments broaden the Administratror's authority to issue emergency orders to abate threats to welfare and the environment, in addition to the authority to respond to threats to "the health of persons." In addition, the amendments eliminate the 24- to 48-hour time limit on the effectiveness of emergency orders. These changes are necessary to enable the Administrator to address air pollution emergencies in an adequate manner, and to conform the Administrator's emergency authority under the Act to emergency authorities under other environemntal laws. See, TSCA section 208, CERCLA section 106, RCRA section 7003, and CWA section 504. Similarly, the deletion of the requirement that the Administrator mnay not bring suit unless State or local authorities have failed to act conforms the Act to other environmental laws.

Broadening section 301 to include harm to the environment is important to enable EPA to address emergency threats to ecosystems in instances where there is no readily demonstrable immediate threat to human health. For example, toxic emissions might be blowing downwind from a facility into an undeveloped natural area and threatening to impair that area's ecosystem. This amendment will allow EPA to order the plant to take necessary steps to eliminate the threat to flora and fauna.

Deleting the unrealistically short time limits on the duration of orders is necessary to ensure that these orders are a viable enforcement tool. In order to protect State interests and to prevent duplication of effort, this section requires that the Administrator consult with the State and local authorities before taking any action.

The enforcement provision, section 303(b), has been deleted as unnecessary because emergency orders have been made enforceable under section 113.

This amendment revises the penalty liability for violations of emergency orders to conform to other provisions of the Act, as well as to the liability provisions contained in other environmental laws. *See,* CERCLA, 42 U.S.C. 9606; TSCA, 15 U.S.C. 2606, 2614, 2615 (a) and (b). This amendment also removes the requirement to establish civil liability by proving that a violation of an emergency order was "willful". This amendment conforms this authority to other requirements under the Act. The standard for criminal violations of emergency orders is changed from "willful" to "knowing" to conform to other criminal provisions contained in section 113 of the Act as well as in the Resource Conservation and Recovery Act. A similar conforming change to the Clean Water Act was made in the 1987 amendments to that statute.

Each of these changes in warranted, not just for purposes of conformity, but also because emergency orders should be strictly enforced in light of the health and environmental threats they address.

Contractor Listings (Section 607)

SUMMARY

Section 607 of the bill amends section 306(a) of the Clean Air Act in two respects:

First, the amendment clarifies that a conviction for any criminal violation listed under section 113 of the Act will subject the violator to section 306 sanctions.

Second, the amendment provides that EPA may extend the Federal contract prohibition "to other facilities owned or operated by the convicted person."

DISCUSSION

In addition to clarifying the bases for section 306 sanctions, the bill also clarifies that after a conviction under section 113(c)(4) (that is, a conviction for knowing false statements, omissions, and the like) two separate actions will be required of the convicted party. First, the false statement must be corrected. Second, the convicted party must obtain a certification by the Administrator that any substantive violation underlying the false statement has been corrected. For example, where the convicted person submitted monitoring information that falsely represented a source to be in compliance with new source performance standards, he must not only correct the information but also obtain a certification from the Administrator that the source is, in fact, in compliance before he can be removed from the "contractor list".

Some business owners have attempted to insulate their endeavors from the strictures of this section simply by dissolving existing business entities and creating new ones. This phenomenon is addressed in this amendment by granting discretionary authority to the Administrator to extend the contractor listing prohibition to other facilities owned by the convicted person. It also addresses situations where determining the definition of the "facility" is problematic—such as asbestos demolition and renovation companies who move their operations from building to building. This amendment clarifies that in such situations EPA can define the facility to be the office of the convicted company. In this fashion, all the company's operations will be affected by the listing. Discretionary rather than mandatory listing of additional facilities provides the flexibility necessary for the EPA to consider variations in the structure of violating industries.

Judicial review Pending Reconsideration of Regulation (Section 608)

SUMMARY

Section 608 of the bill amends section 307 of the Act by providing that petitions for reconsideration of final actions by the Administrator shall not render those actions non-final for purposes of judicial review, nor extend the time within which petitions for review can be filed, nor postpone the effectiveness of the action for which reconsideration is sought.

DISCUSSION

The purpose of this amendment is to clarify and confirm that under section 207(b), as under section 307(d)(7)(B), a petition for Agency reconsideration does not render Agency action non-final for purposes of judicial review, and does not toll the 60-day time period for seeking judicial review. This amendment is designed to ensure prompt judicial review of final actions by EPA, and to assure that the pendency of a petition for reconsideration does not delay that review or limit the effectiveness or enforceability of EPA's action pending reconsideration or juducial review. Notwithstanding this amendment, however, the courts retain the discretion to stay consideration of the appeal pending recondiseration by EPA, as well as to stay implementation of the rule.

This amendment overrules *West Penn Power Co.* v. *EPA*, 860 F. 2d 581 (3d Cir. 1988), which held that the pendency of a petition for agency reconsideration rendered the challenged agency action non-final for purposes of judicial review. Contrary to the analysis and decision in that case, this amendment reaffirms what both the language and the legislative history of section 307(b) demonstrate, this is, that Congress intended EPA rulemaking action to be final upon final promulgation, not upon a decision on reconsideration. EPA rulemaking under the Act is reviewable in the Federal courts of appeal only if review is sought within the Act's 60-day review period. This provision is essential to the efficient implementation of the Act's regulatory program. Allowing *West Penn* to stand would delay judicial review of EPA actions, and would encourage the filing of petitions for reconsideration as a delay tactic.

Citizen Suits and Petition (Section 609)

SUMMARY

Section 609 of the bill amends section 304 of the Act in a number of respects.

First, the bill amends section 304(a) of the Act by authorizing the Federal district courts to apply civil penalties in citizen suits, which penalties shall be payable into a special fund created in new subsection 304(g).

Second, the amendment adds new subsection 304(g), which provides that penalties assessed in citizen suits shall be deposited in a special fund in the United States Treasury. The bill further provides that this special fund shall remain available for use by EPA to finance air compliance and enforcement activities.

Third, the bill amends section 304(c) of the Act to authorize EPA to intervene at any time, as a matter of right, in any citizen suit brought under the Act. In addition, the bill provides that EPA can substitute itself for the plaintiff in those actions with regard to any claims for civil penalties.

Fourth, the bill further amends section 304(a) of the Act by providing that a citizen suit may be brought against the Administrator where there is alleged a failure to act that violates one or more of the standards set out in section 307(d)(9) of the Act, or that constitutes unreasonable delay. In addition, section 304(a) is amended to make clear that the court's power to compel the Administrator to take an action specified in the Act is not depended upon whether the Administrator has published a determination in the Federal Register that threshold preconditions to that action are met.

Fifth, a new paragraph is added to section 304(c) of the Act which provides that plaintiffs initiating citizen suits must serve a copy of their complaint upon the Attorney General of the United States and upon the Administrator. The bill further provides that the United States must be given advance notice of, and an opportunity to comment upon, any consent judgment proposed to be entered in a citizen suit.

Sixth, section 307(b) of the Act is amended to authorize challenges to EPA decisions to defer action under the Act. The bill provides that such challenges may be brought either pursuant to section 307(b)(1), or in an action to compel performance in Federal district court under 304(a)(2).

Seventh, section 307 of the Act is amended by adding a new subsection that allows any person to petition EPA to issue, amend, reconsider, or repeal any regulation or order issued under the Act. The section further provides that the Administrator shall either grant or deny any such petition within twelve months, unless the petition arises under section 307(d)(7)(b), in which case the time limit is four months. Finally, the section provides that the Administrator shall take final action "within a reasonable time" on petitions that are granted.

DISCUSSION

These amendments make several important changes and clarifications in the citizen enforcement provision of the Act.

As is the case in section 505 of the Clean Water Act and in section 7002 of the Resource Conservation and Recovery Act, the amendment would authorize Federal district courts to assess civil penalties in citizen suits. The assessment of civil penalties for violations of the Act is necessary for deterrence, restitution and retribution. Such penalties must be paid into a special fund in the United States Treasury.

The amendments clarify and confirm the current status of the law that provides that the United States is not bound by a lawsuit to which it is not a party. This clarification ensures that citizens suits do not interfere unduly with the government's own enforcement prerogatives.

The amendments require the service of certain key pleadings by the private litigants in citizens suits upon the Administrator and upon the Attorney General. Currently, the Act requires only that a notice of intent to sue be served on the Administrator. However, a notice alone does not allow the government to monitor the progress of a citizen suit. Accordingly, the amendments will require the plaintiff to serve the United States with a copy of the complaint. In addition, the amendments will require the parties to a citizens suit to serve the United States with a copy of any proposed consent judgment. This amendment conforms to the requirements contained in other environmental statutes, including section 1449 of the Safe Drinking Water Act and section 113(1) of the Comprehensive Environmental Response, Compensation, and Liability Act.

The amendments will allow a citizen suit to be brought in Federal district court against the Administrator where the plaintiff alleges that EPA has failed to act, and further alleges that the failure violates one or more of the standards set out in section 307(d)(9) of the Act, or that the failure constitutes unreasonable delay. Under this amendment, the citizen suit provision of the Act will encompass the full range of inaction covered by the Administrative Procedure Act (AP). Under this amendment, the district courts would be granted authority to compel actions by the Administrator that have been unreasonably delayed, as well as to design remedies to address EPA failures to act that are arbitrary, capricious, and abuse of discretion or not in accordance with law. The term "failure to act" is taken directly from the definition of "agency action" in section 551(13) of the APA.

It has been clear since the 1977 amendments to the Act that judicial review of other items included in the APA definition of agency action ("an agency rule, order, license, sanction, relief, or the equivalent of denial thereof") lies in the Federal courts of appeal pursuant to section 307(b)(1). However, the availability of judicial review of a failure to act has been unclear. The amendment will clarify that such review is available, and will assign it to the Federal district courts, in keeping with the general principle that those courts are better suited to address claims of agency inaction than are the courts of appeals.

Of course, where adjudiciation of a challenge to EPA inaction would effectively require a court to overturn final action previously taken by the EPA, jurisdiction over the challenge would like in the court of appeals under section 307(b)(1). See *Indiana & Michigan Electric Co.* v. *U.S. EPA,* 733 F. 2d 489, 490 (7th Cir. 1984) (courts of appeals have jurisdiction over cases where a complaint about agency inaction is "embedded" in a challenge to agency action). In addition, where the EPA inaction culminates in a formal decision not to take action, such a situation would constitute a "denial" within the meaning of APA section 551(13) and would likewise be reviewable in the courts of appeal under section 307(b)(1).

Where the Agency does not concede that it has a duty to take action, the citizen suit will test the plaintiff's claim that the failure to act is not in accordance with law (for example, that it violates an unqualified and specific "shall" command in the Act) or that it is arbitrary, capricious, or an abuse of discretion. Examples of the latter categories would include circumstances where the failure to act is not rationally based, ignores clear evidence, or where it frustrates the purposes and goals of the Act by failing to correct deficiencies in air pollution standards or regulations. If the district court ruled for the plaintiff on EPA's duty to proceed, the court would then establish—incident to its equitable jurisdiction—a deadline for the Agency to perform its unfulfilled obligations See *State of New York* v. *Thomas,* 613 F. Supp. 1472 (D.D.C. 1985) *rev'd on other grounds,* 802 F. 2d 1443 (D.C. Cir. 1986).

The amendment also gives the district courts jurisdiction under section 304(a)(2) to compel agency action unreasonably delayed. This jurisdiction would apply in circumstances where EPA has already commenced a proceeding directed at the final action sought by the plaintiff, but had failed to complete it within a reasonable time. In some such cases, EPA could be expected to concede to the court and to the parties that it has a duty to go forward, and the court's role in that situation will be limited to determining whether EPA is taking an unreasonable amount of time in so doing. In other cases, the EPA could be expected to dispute both the claim of unreasonable delay and the existence of any duty to proceed. In this latter situation, the court would not be limited solely to imposing a deadline for the Administrator's decision in the event the plaintiff were to prevail. Instead, the court in those cases where the plaintiff prevails should also go on to define the scope of EPA's duty and specify the particular actions EPA must take to fulfill that duty within the court-imposed deadline.

The amendments include a provision clarifying that the district court's power to compel EPA to act is not restricted by the fact that EPA has failed to publish threshold determinations or findings in the Federal Register, either in proposed or in final form. This amendment would overrule the holding in *State of New York* v. *Thomas,* 802 F. 2d 1443 (D.C. Cir. 1986).

The amendments address situations where an EPA final decision addresses only part of an air pollution issue, and defers the balance of the issue for resolution at a later time. In those situations, the amendments will provide that citizens have the option of suing either under section 307(b)(1) in the Federal courts of appeals (within sixty days of the EPA final action that announced the deferral) or under section 304(a)(2) in the district court (without any statutory time limit).

The amendments add a new provision to section 307 of the Act to clarify that EPA has a duty to conclude the proceedings enumerated in section 307(d)(1) within a reasonable time. The amendment will ensure prompt EPA response to petitions for action, and ensure that the response is issued in final, judicially reviewable form. The amendment will cover requests for all possible kinds of EPA action, specifically including the issuance, amendment, reconsideration, or repeal of a regulation or order under the Act.

ENHANCED IMPLEMENTATION AND ENFORCEMENT OF NEW SOURCE REVIEW REQUIREMENTS (SECTION 610)

SUMMARY

Section 610 of the bill amends section 167 of the Act by adding the terms "operation" and "modification" to the term "construction of a major emitting facility".

DISCUSSION

The purpose of this amendment is to clarify and confirm that the Administrator is authorized to prohibit the operation or modification, as well as the construction, of a new source which has violated new source requirements. Any orders issued or other measures taken by the Administrator under section 167 to enforce new source review requirements are civilly and criminally enforceable under section 113. See, *United States* v. *Louisiana Pacific Corp.*, CA No. 86-A-1880 (D. Colo.). In this respect, this amendment grants to EPA the same powers with respect to new sources as it has with respect to existing sources.

MOVABLE STATIONARY SOURCES (SECTION 611)

SUMMARY

Section 611 of the bill amends section 302 of the Act by adding a definition of the term "stationary source" that excludes "emissions resulting directly from an internal combustion engine for transportation purposes".

DISCUSSION

This amendment clarifies and confirms that a source cannot escape regulation under title I of the Act merely because it may be mobile, or because it may be moved by means of a motor. The authority in title I of the Act to regulate stationary sources is intended to include the regulation of any source capable of being moved from one location to another if the source emits a pollutant from a process other than, or in addition to, the means of propulsion employed to move the source. For example, portable asphalt concrete plants and ships in port emit pollutants as a result of their stationary activities. Such sources have, nevertheless, argued that they should not be regulated under title I of the Act, and that if they are to be subject to any regulation under the Act they should be regulated under title II. While emissions resulting from the propulsion of sources such as these may be regulated under title II, their process emissions are properly regulated under title I.

AUTHORIZATIONS (SECTION 612)

SUMMARY

The bill authorizes for fiscal years 1991-95 the following amounts: $120,000,000 for grants to States under section 105 of the Act; $90,000,000 for research and development authorized by sections 103 and 104 and other sections of the Act; and $250,000,000, in addition to the amounts above for EPA to carry out the requirements of the Act. The bill also authorizes an additional $50,000,000 per year for fiscal years 1991 and 1992 for grants to States to prepare implementation plans required by new subparts 2, 3, and 4 of part D of the Act.

DISCUSSION

The amounts authorized represent the minimum resources EPA and the States will need to make acceptable progress in reducing (1) unhealthy levels of criteria pollutants, (2) acid rain precursors (3) toxic pollutants, and (4) emissions of CFCs. The additional funds authorized for State grants for fiscal years 1991 and 1992 provide resources States will need for their major efforts to prepare State implementation plans for areas that are nonattainment for ozone, carbon monoxide, or PM-10. Funds from permit fees that are required by the bill will not begin to support State programs for approximately that two-year period.

TITLE VII—THE STRATOSPHERIC OZONE AND CLIMATE PROTECTION ACT

INTRODUCTION

Two distinct but closely related global environmental crises are (1) destruction of the stratospheric ozone layer, Earth's main shield against the sun's harmful ultraviolet radiation, and (2) massive, uncontrolled global climate change associated with intensification of the greenhouse effect.

Destruction of the ozone layer is caused primarily by the release into the atmosphere of chlorofluorocarbons (CFCs) and similar manufactured substances—persistent chemicals that rise into the stratosphere where they catalyze the destruction of stratospheric ozone. A decrease in stratospheric ozone will allow more ultraviolet (UV) radiation to reach Earth, resulting in increased rates of disease in humans, including increased incidence of skin cancer, cataracts, and, potentially, suppression of the immune system. Increased UV radiation has also been shown to damage crops and marine resources.

The threat of uncontrolled global climate change is caused by the accelerating accumulation of greenhouse gases in the atmosphere, primarily carbon dioxide, CFCs and methane. The greenhouse effect results from the fact that the planet's atmosphere is largely transparent to incoming radiation from the sun but absorbs much of the lower energy or infrared radiation reemitted by the Earth. This natural phenomenon makes the Earth warm enough to support life. As emissions of greenhouse gases increase, however, the planet is warmed unnaturally. The rate and extent of this human induced warming is predicted to lead to wide-scale climate changes.

Carbon dioxide emissions from the combustion of fossil fuels and deforestation account for an estimated 50 percent of current intensification of the greenhouse effect. CFCs are estimated to account for 15 to 20 percent of current intensification of the greenhouse effect. The fact that each molecule of certain CFCs has approximately 20,000 times more impact on global warming than does a single molecule of carbon dioxide makes the elimination of CFCs the single most effective step that can be taken to lessen the threat of human-induced global climate change. Similarly, emissions of methane account for an estimated 20 percent of current intensification of the greenhouse effect and each molecule of methane has approximately 25 times more impact on global warming than a molecule of carbon dioxide.

If present emission trends continue, and unless some as yet undocumented phenomenon causes an offsetting cooling, the planet will, on average, get hotter because of the accumulation of these gases. The predicted environmental impacts of an intensified greenhouse effect include:

—an increase in the global average temperature of 1.5 to 6 degrees Centigrade (3 to 11 degrees Fahrenheit) over the next 40 to 60 years and continuing increases at an equally alarming rate in succeeding years (to be compared with a relatively stable global average temperature that has generally varied by less than 1 degree Centigrade over the last *5,000* years);

—the extinction of numerous species of plants and animals that will be unable to adapt to rapidly changing environmental conditions and significant interference with natural evolutionary processes;

—reduced soil moisture content and altered storm and precipitation patterns that may seriously disrupt the U.S. and world agricultural production (possibly causing dustbowl conditions in the U.S. grain belt);

—a rise in sea level of 1 to 4 feet over the next 60 to 100 years and continuing sea level rise in succeeding years (primarily due to the expansion of ocean water's when they are warmed); and

—a shift in ocean currents that could dramatically alter the climates of many regions (a diversion of the Gulf Stream, for example, would transform Western Europe's climate, making it far colder than it is today).

As alarming as a global average temperature increase of 1.5 to 6 degrees Centigrade is (it has been 2 million years since the Earth was 2 degrees warmer and 65 million years since the Earth was 6 degrees warmer and dinosaurs roamed the planet), the true environmental impact of an intensified greenhouse effect would be even greater than those numbers suggest. "Global averages" disguise what can happen locally in different seasons. For example, a global average temperature rise of 3 degrees Centigrade (5 degrees Fahrenheit) may result in increases of more than 10 degrees Centigrade (18 degrees Fahrenheit) at high latitudes in some seasons.

The full impact of sea level rise can only be appreciated when it is recognized that an increase in sea level of just *one* foot would inundate an area as far back as 100 to 200 feet from current coastlines. A vastly disproportionate share of the world's economic wealth is concentrated along coastlines that are at high risk. Nearly one-third the human population lives within 36 miles of a coast and many reside on land that would be lost. Low lying coastal areas and river deltas, such as the Mississippi and the Ganges, are likely to be flooded.

An average temperature rise of only 3 degrees Centigrade (5 degrees Fahrenheit) could, in addition to causing thermal expansion of the oceans, cause the melting of land-based ice and increase sea levels by more than 2.5 feet, more than enough to flood vast unprotected coastal lands. Such a rise could inundate low-lying areas, destroy coastal wetlands, erode shorelines, worsen coastal flooding, and increase the salinity of rivers, bays, and aquifers.

Estimates are that a 1.6 foot sea level rise would displace 16 percent of the population in Egypt. The situation in Bengladesh might be even worse—a 1.6 foot sea level rise would flood large areas of the country, and a 6.6 foot rise would claim 28 percent of the land, where 30 million of its people live today and where more than 59 million people are projected to live by 2030. The cost of holding back the sea in countries such as the Netherlands and the United States could be tens of billions of dollars.

Some positive consequences of global climate change may occur, such as improved conditions for agriculture in those northern areas that have both adequate soils and water supplies. As the 1988 drought in the U.S. demonstrated, however, industrial and rural societies depend on the normal, predictable functioning of the climate system. Experts predict that climate undergoing rapid change will not only be less predictable because it is different, but it may be inherently more variable. Many climatologists believe that as accumulating greenhouse gases force the climate out of equilibrium, climate extremes such as hurricanes and droughts will become more frequent and perhaps more intense.

The socio-economic and political impacts of an intensified greenhouse effect are likely to be as severe and devastating as the environmental impacts. The suggestion that there will be "winners and losers" as a result of global climate change is misguided. The rate and extent of these unprecedented global changes would destabilize social, economic, and political regimes on a worldwide basis. Such widespread disequilibrium would not work to the advantage of any nation. There will be no "winners." As stated by Prime Minister Brundtland of Norway, "the importance of climate change may be greater and more drastic than any challenges mankind has faced with the exception of nuclear war."

It is easy to overstate the uncertainty that surrounds this issue. It is true that scientists disagree about matters such as whether the greenhouse effect has already begun. Similiarly, there is no scientific consensus about the precise timing or magnitude of the predicted changes.

Nevertheless, there is a remarkable degree of scientific consensus concerning the threat of massive, uncontrolled global climate change. Specifically, most experts agree that if we do not change our pattern of polluting the atmosphere, many of us, our children, and our grandchildren will experience devastating climate changes of a magnitude and at a rate that will preclude natural evolutionary responses.

There appears to be consensus on another critical point. That is: by the time there is scientific proof for every detail of the problem, it will be too late to avoid the most devastating impacts of an intensified greenhouse effect and global climate change. We can ill-afford to wait for 5 or 10 years of research before we take action to (1) limit the rate and extent of future climate change by reducing atmospheric emissions and concentrations of greenhouse gases, and (2) implement adaptation strategies for coping with the changes to which we are already committed.

Failure to act on the greenhouse effect on the basis of current scientific understanding would replicate the mistake made in the early 1980's with respect to destruction of the ozone layer.

In 1974, Drs. Sherwood Rowland and Mario Molina from the University of California published a paper demonstrating how CFCs destroy ozone in the stratosphere. In this country, the original scientific theory led to the ban of CFCs in aerosols in 1978. There were no measurements of actual ozone loss, just the scientific theory and predictions of damage to the atmosphere.

Recognizing the problem, industry began to look for safe substitutes. Progress was being made when, in the early 1980's, the Federal Government relaxed efforts to regulate industry, the search for substitutes came to a virtual standstill, and worldwide use of CFCs continued to grow. Today, the U.S. produces and consumes approximately 700 million pounds of CFCs each year, accounting for roughly one-third of the world total. See Figure VII-1, showing U.S. contribution to worldwide CFC and halon consumption. Non-aerosol uses of CFCs in the U.S. have grown to record high levels and per capita usage of CFCs in the U.S. is among the highest in the world. See Figure VII-2, showing per capita use of CFCs and halons in 1986.

1986 WORLDWIDE CFC & HALON CONSUMPTION

(WEIGHTED BY OZONE DEPLETION POTENTIAL)

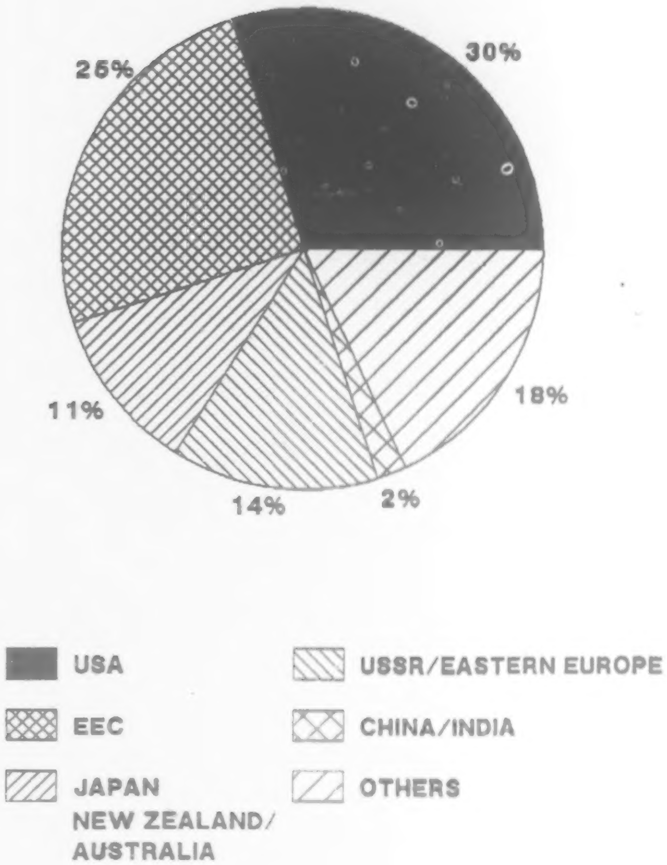


Figure VII-1

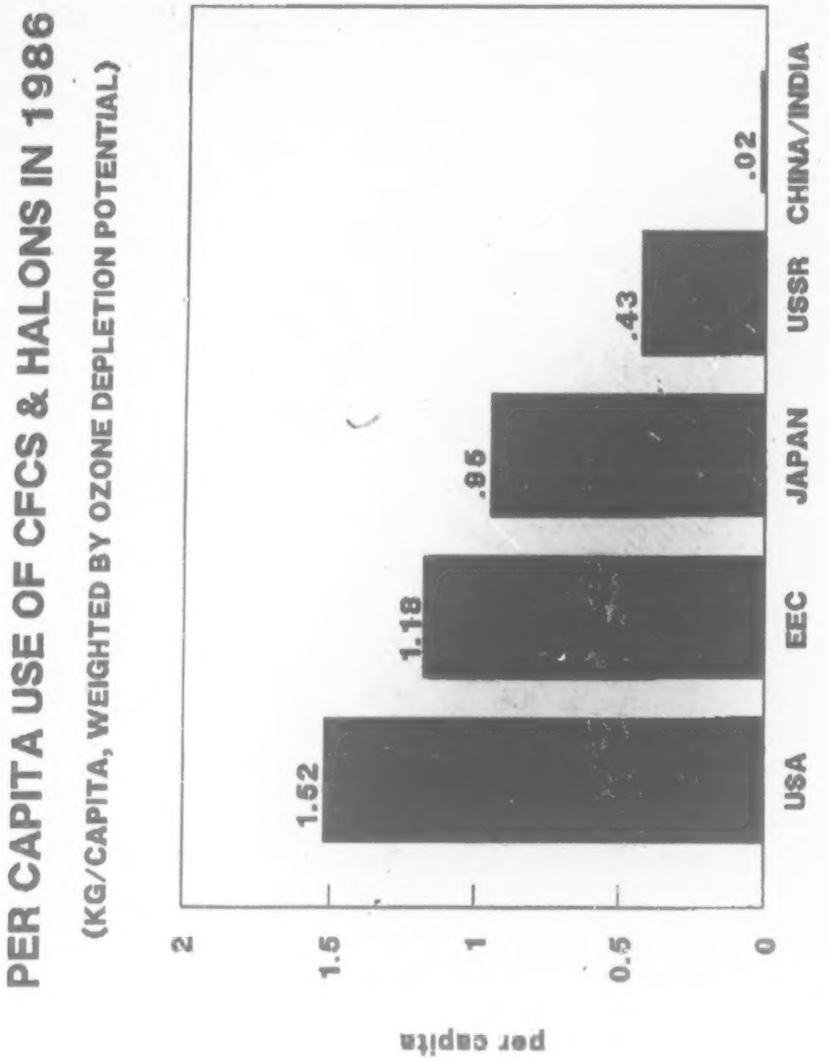

PER CAPITA USE OF CFCS & HALONS IN 1986
(KG/CAPITA, WEIGHTED BY OZONE DEPLETION POTENTIAL)
per capita
2
1.5
1
0.5
0
1.52
1.18
.95
.43
.02
USA
EEC
JAPAN
USSR
CHINA/INDIA

Figure VII-2

In 1985, scientists discovered a significant loss of ozone over a portion of the southern hemisphere that was about the size of North America. The collapse of the ozone layer was not predicted by any of the scientific theories or models. Measurements of what has become a seasonal phenomenon have revealed losses greater than 50 percent in the total column and greater than 95 percent between an altitude of 15 to 20 kilometers (9 to 12 miles). The discovery of this "Hole" in the stratospheric ozone layer over Antarctica gave renewed impetus to international efforts to understand and protect the ozone layer.

In September 1987, the Montreal Protocol on Substances that Deplete the Ozone Layer (the Protocol) was negotiated and signed by more than two dozen nations. The Protocol entered into force in January 1989 and approximately 50 nations are now Parties to the Protocol.

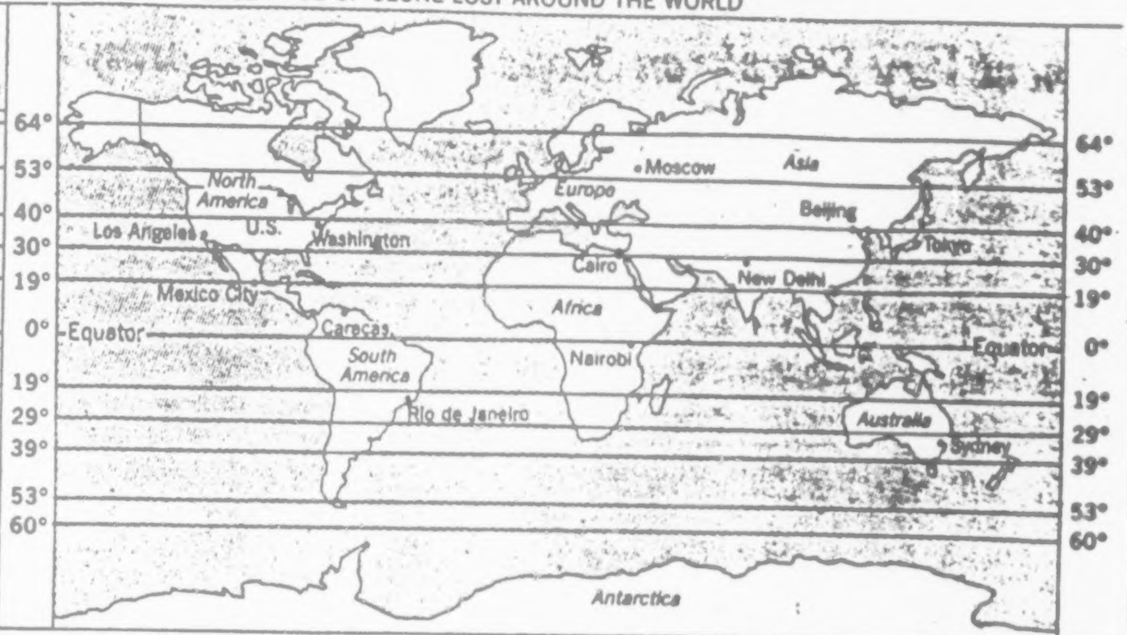
Signatories to the Protocol, including the United States, agreed to respond to this threat by imposing limits on consumption (defined as production plus imports minus exports of bulk quantities) of CFCs and halons. Production and use of CFCs and halons are being curtailed worldwide because of the risks that current production levels and use patterns pose to human health and the environment. The current version of the Protocol requires industrialized countries such as the United States to (1) limit CFC consumption, beginning in 1989, (2) reduce CFC consumption 50 percent by 1998, and (3) limit halon consumption, beginning in 1992.

Since the Montreal Protocol was negotiated and signed in 1987, the causal link between CFCs and the Antarctic ozone "Hole" has been substantiated. In addition, recent scientific studies have demonstrated that destruction of the ozone layer is not limited to remote, uninhabited portions of Antarctica. Scientists have observed and measured losses of ozone on a global scale. Losses of ozone since 1970 have been measured during the winter months on a worldwide basis, including losses ranging from 2.3 percent to 6.2 percent over densely-populated portions of the Northern Hemisphere. See Figure VII-3, showing measurements of ozone losses at various latitudes around the world.

ATMOSPHERIC OZONE LEVELS: A GLOBAL DECLINE

PERCENTAGE OF OZONE LOST AROUND THE WORLD

Year-round decrease	Winter decrease
−2.3%	−6.2%
−3.0	−4.7
−1.7	−2.3
−3.1	
−1.6	
−2.1	
−2.6	
−2.7	
−4.9	
−10.6	
−5.0 or more	


64°
53°
40°
30°
19°
0°
19°
29°
39°
53°
60°
North America
U.S.
Los Angeles
Washington
Mexico City
Equator
Caracas
South America
Rio de Janeiro
Europe
Moscow
Asia
Beijing
Tokyo
Cairo
Africa
New Delhi
Nairobi
Equator
Australia
Sydney
Antarctica
64°
53°
40°
30°
19°
0°
19°
29°
39°
53°
60°

NOTE. Data for the area 30 to 64 degrees north of the equator is based on information gathered from satellites and ground stations from 1969-86. Data for the area from 60 degrees south to the South Pole is based on information gathered from satellites and ground stations since 1979. All other information was compiled after November 1978 from satellite data alone.

SOURCE: Ozone Trends Panel

Figure VII-3

These measurements of actual ozone loss are significantly greater than computer models had predicted and raise serious questions about the adequacy of the control measures set forth in the Montreal Protocol and existing EPA regulations. Recent reports from Antarctica showing that this year's "Hole" has grown and now covers *10 million* square miles, in addition to reports from the Arctic indicating the possible formation of a Northern Hemisphere "Hole", lend a new sense of urgency to ongoing negotiations to amend and strengthen the Montreal Protocol.

By waiting for measurements of actual ozone loss, by failing to take appropriate action on the basis of credible scientific theory, governments around the world allowed a manageable environmental threat to become an environmental crisis. As a result of atmospheric lag time and the persistence of CFCs and similar ozone depleting and greenhouse forcing gases, it is to late to *prevent* additional damage to the ozone layer or human-induced global climate change. Our challenge is to take action as rapidly as possible that will, to the greatest extent possible, (1) reduce the threat of additional damage to the ozone layer and (2) reduce the rate and magnitude of human-induced global climate change.

SUMMARY

Title VII of this legislation adds a new title V to the Clean Air Act that shall be known as The Stratospheric Ozone and Climate Protection Act. The new title begins by emphasizing the facts that (1) the ozone depleting chemicals subject to controls under this Act are also greenhouse gases and that (2) this Act will help address two related but distinct environmental problems—global climate change resulting from an intensified greenhouse effect and destruction of the stratospheric ozone layer.

The new title is divided into two parts:

A—Control of Chlorofluorocarbons and Other Manufactured Substances; and

B—Methane Assessment.

Part A of the Stratospheric Ozone and Climate Protection Act is modeled after legislation introduced in February 1987 (S. 571) and reintroduced on March 2, 1989, by Senators Chafee and Baucus (S. 491). The Committee held six days of hearings on stratospheric ozone and global climate change matters since the bill was first introduced, the most recent hearing being conducted on May 19, 1989. Part A has seven main elements:

first, it establishes as a national policy that the production and use of all fully halogenated chlorine or bromine containing compounds, including chlorofluorocarbons (CFCs) 11, 12, 113, 114, and 115, the halons, and carbon tetrachloride, should be reduced *and eliminated* "as expeditiously as possible";

second, the Administrator is required to implement a phase-out schedule to control, reduce and eliminate production more rapidly than the schedule set forth in the Act if (1) information suggests such an accelerated schedule may be necessary to protect human health and the environment, (2) the Administrator determines, based on the availability of substitutes, that an accelerated schedule is attainable, or (3) the Montreal Protocol on Substances that Deplete the Ozone Layer (the Protocol) is modified to include a schedule that is more stringent than that included in the Act;

third, subject to acceleration by the Administrator as outlined above, the Act places the fully halogenated CFCs, including CFCs–11, 12, 113, 114, and 115, on a production phase-down schedule that tracks the current version of the Montreal Protocol (20 percent reduction in 1993 and 50 percent reduction in 1998), and adds an additional step: virtual elimination by not later than 2000;

fourth, where the current version of the Protocol will only freeze production of the halons and does not regulate carbon tetrachloride at all, both of which are powerful ozone depleters, the Act puts these chemicals on the same phase-out schedule as the fully halogenated CFCs;

fifth, where the current version of the Protocol will allow unlimited production and use of other ozone depleting chemicals such as the partially halogenated halocarbons, including hydrochlorofluorocarbon (HCFC) 22 and methyl chloroform, and, in turn, continue the threat to the ozone layer, the Act will place a limit on the production and use of such chemicals;

sixth, the Act includes a supplement to the production phase-out: recognizing that it would be extremely difficult to eliminate all *production and use* of ozone depleting and greenhouse chemicals on a 2 to 3 year time frame, the Act provides for significant reductions in the *emissions* that are destroying the ozone layer and contributing to the greenhouse effect; to acheve this—

> the practice of venting or releasing these chemicals from refrigeration and air-conditioning units into the environment will be prohibited as of January 1, 1992;
>
> EPA must promulgate standards to control emissions to the lowest achievable rate, including recapture and recycling regulations by July 1, 1991 and safe disposal regulations by January 1, 1994; and
>
> specific limitations and controls are prescribed for (1) motor vehicle air-conditioning systems (mandatory recapture and recycling by January 1, 1992 and, beginning with model year 1994, mandatory use of alternative air-conditioning systems) and (2) nonessential consumer products containing CFCs (a ban on sale and distribution of items such as CFC-propelled plastic party streamers and noise horns one year after enactment); and

seventh, 12 months after this Act becomes law, importation of priority list substances (including CFCs 11, 12, 113, 114, and 115, halons and carbon tetrachloride) in bulk or in products will be prohibited unless EPA certifies that the country of origin is a party to and in compliance with the Montreal Protocol; and persons subject to U.S. jurisdiction will be prohibited from transferring technology or investing in facilities to produce or expand the use of such substances in countries that have not been certified.

Part B of the Stratospheric Ozone and Climate Protection Act is designed to develop information that is lacking on methane, one of the three most significant greenhouse gases (CFCs and carbon dioxide are the other two most significant greenhouse gases.) The Administrator of EPA, together with the Administrators of NOAA, NASA, and the heads of other relevant federal agencies, is directed to study and report to Congress on the factors causing atmospheric concentrations of methane to increase; the sources of methane emissions; and opportunities for reducing such emissions.

DISCUSSION AND SECTION-BY-SECTION ANALYSIS

Section 701

This section of the bill repeals part B of the Clean Air Act, sections 150 through 159, entitled "Ozone Protection."

The issues addressed in part B of the existing law and the authority under which EPA has promulgated regulations to control the production and use of ozone depleting substances are being transferred by this legislation to a new title V of the Clean Air Act. Since the new title is an expansion of existing statutory authorities, repeal of section 150 through 159 shall not be construed as invalidating, suspending or otherwise interfering with the enforcement of existing regulations concerning ozone protection.

Section 702

A new title V is added to the Clean Air Act to be known as the Stratospheric Ozone and Climate Protection Act. A section-by-section analysis of this new title follows.

Findings.—The new title begins by emphasizing the facts that (1) the ozone depleting chemicals subject to controls under this Act are also greenhouse gases and that (2) this Act will help address two related but distinct environmental problems—global climate change resulting from an intensified greenhouse effect and destruction of the stratospheric ozone layer.

Various findings are included regarding the nature of the problem, the status of scientific understanding and government responses, and the need to impose additional controls to supplement the Montreal Protocol.

Objectives and National Goal.—The objectives of this new title are to restore and maintain the chemical and physical integrity of the Earth's atmosphere, to protect human health and the global environment, and to provide a smooth transition from the use of ozone-depleting chemicals to safe substitutes.

The national goal is declared to be the elimination of emissions of manufactured substances with ozone depleting potential as well as global warming potential, to reduce to the maximum extent possible emissions of other greenhouse gases, and to provide for an orderly and equitable shift to safe alternatives.

The safe substitutes or alternatives referred to in this Act are not limited to chemical substitutes. Changes in manufacturing processes or product designs that eliminate or, at a minimum, significantly reduce the need for chemicals that pose a threat to the global climate or the stratospheric ozone layer should be pursued vigorously by all who are currently relying on the use of ozone-depleting or greenhouse-forcing chemicals.

Similarly, the threats of ozone depletion and global climate change make it necessary for some industry groups, such as refrigeration and insulation manufacturers, to consider (or reconsider) substitutes that may have been rejected previously on the basis of product liability considerations. To the extent adequate safegurds can be incorporated into product designs or other precautionary measures can be taken, it may be desirable to substitute such manageable risks for the risks asssociated with global climate change and destruction of the ozone layer.

Definitions. The following phrases are defined: Administrator; household appliances; import; manufactured substances; medical purposes; person; to produce; Secretary; and substances covered by this title.

In addition to being produced and used as end-products, some of the substances subject to controls under this new title may be necessary raw materials or feedstocks for the production of other, more environmentally acceptable chemicals. The definition of "to produce" tracks EPA's regulations implementing the Montreal Protocol and will allow the continued production and use of such substances provided they are used and entirely consumed in the manufacture of other chemicals. As in current EPA regulations, recycled substances are excluded from the definition of production.

PART A—CONTROL OF CHLOROFLUOROCARBONS AND OTHER MANUFACTURED SUBSTANCES

Listing of Regulated Substances.—The Administrator is directed to publish a "priority list" of chemicals to be phased-out. All fully halogenated chlorine or bromine containing compounds are to be placed on the priority list of substances to be phased-out, including CFCs 11, 12, 113, 114, 115, carbon tetrachloride, and halons 1211, 1301, and 2402.

The examples listed in the Act are those known to pose the greatest threat to the ozone layer and global climate but may not be a complete list due to the problems of "designer chemicals" (the creation of substances that are similar to the listed chemical but identified by another name) and the creation of new chemicals that have comparable ozone depletion or global warming potentials.

In addition to the problem of "designer chemicals", analysis of data on high levels of emissions of, for example, methyl chloroform, might justify the addition of one or more chemicals to the priority list that are not fully halogenated chlorine or bromine containing compounds. The Administrator is authorized and directed to make such additions.

The Administrator also is directed to publish a list of "other regulated substances" that will be subject to controls under this Act. This list is to include all partially halogenated chlorine containing compounds that have not been placed on the "priority list" under subsection (a), including hydrochlorofluorocarbons (HCFCs) 22, 123, 124, 141(b), 142(b) and, unless added to the priority list, methyl chloroform.

Treating "other regulated substances" separately from the "priority list" will allow production and use of these "other" substances to continue as interim substitutes for "priority list" substances while, at the same time, assuring that total chlorine loading of the atmosphere is reduced as quickly as possible.

The Administrator is directed to publish ozone depletion potentials, global warming potentials and atmospheric lifetimes of listed substances. The Administrator also is directed to publish chlorine contribution values that are based on potency, lifetime, and production levels of listed substances.

The ozone depletion potential (ODP) of a halocarbon is calculated with a chemical model for stratospheric ozone, assuming that the gas is in a steady state between emissions and atmospheric loss. The ODP is defined relative to CFC-11 rather than in absolute units of, for example, percentage ozone loss per kilogram of gas emitted. Greenhouse warming potentials (GWP) are calculated similarly with a model for steady-state climate change. For most CFCs the time to approach relatively steady-state conditions is more than a century. Therefore, ODPs and GWPs reflect the relative chronic ozone destruction or warming potential of a substance after nearly constant emissions for a century. ODPs and GWPs do not clearly reflect the contribution of different halocarbons to the amount of chlorine in the atmosphere over the next decade and beyond.

The risk to the ozone layer that is presented by a given chemical is determined by the total amount of stratospheric chlorine contributed by that chemical. Such contribution is determined not only by the atmospheric lifetime of the chemical, but also by the quantity of its emissions and the amount of chlorine it contains.

The accuracy of ODP calculations is further complicated by the fact that the current assessment models are based on atmospheric chemistry theories that do not predict the Antarctic ozone hole or the possibility of similar chemically driven ozone loss in the Arctic lower stratosphere. For these reasons, the Administrator is directed to publish chlorine contribution values that demonstrate the contribution of individual halocarbons to overall chlorine levels.

EPA is expected to publish "chlorine contribution values" in two forms. One approach should present scenarios of future chlorine loadings and permit analysis of future peaks and rates of increase or decline. The other approach should be based on past emissions and the percentage of total chlorine loading in a given year that is attributable to each chemical.

The second approach could then be used to demonstrate that in 1985, for example, CFC-11 contributed approximately 22 percent of the total chlorine loading of 3 parts per billion (ppb), CFC-12 contributed around 25 percent, methyl chloroform and carbon tetrachloride accounted for approximately 13 percent each, CFC-113 and HCFC-22 each contributed approximately 3 percent, and CFC-114 and 115 accounted for less than 1 percent each. Natural sources contributed almost all of the remaining 20 percent. See Figure VII-4, showing contributions of various chemicals to 1985 atmospheric chlorine levels.

CONTRIBUTIONS TO ATMOSPHERIC CHLORINE: 1985

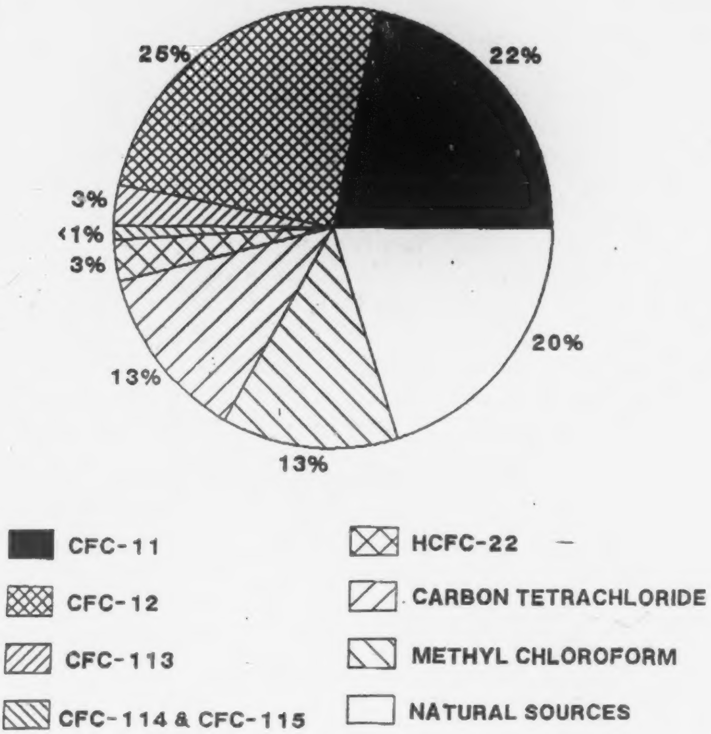


Figure VII-4

Even though methyl chloroform has a relatively short atmospheric lifetime, its contribution to current atmospheric chlorine levels is significant because it is produced and used in large quantities (roughly equivalent to the total of all CFCs combined) and because it contains three chlorine atoms.

Reporting Requirements.—Each person producing or importing a substance covered by this Act is required to file annual reports with EPA setting forth the amount of the substance that was produced or imported by such person.

Production Phase-Out of Substances on the Priority List

National Policy.—It is national policy that the production and use of chemicals on the priority list be reduced and eliminated "as expeditiously as possible."

The rapid appearance of the "Hole" over Antarctica during the last decade demonstrates the extremely nonlinear response of polar ozone to increasing chlorine levels. As stated in a recent paper by Drs. Prather and Watson, "we must be prepared for new thresholds of accelerated ozone loss in the Arctic as chlorine concentrations continue to rise above the current (record) levels of about 3 ppb."

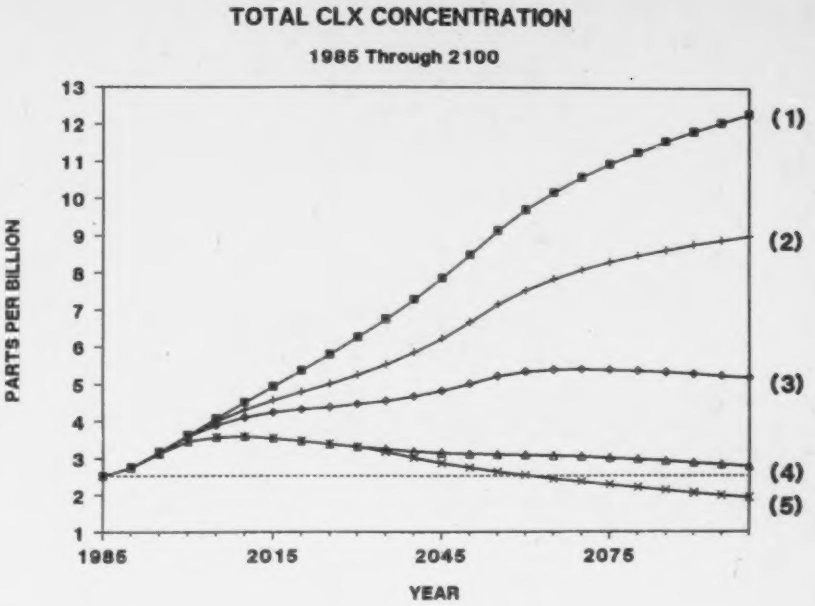
The importance of (1) phasing out the most harmful ozone depleting chemicals as quickly as possible and (2) controlling growth in other, less potent ozone depleting substances was graphically demonstrated by testimony presented to the Committee by EPA on May 19, 1989. Subsequent analyses have produced the following estimates of total atmospheric chlorine concentrations under various scenarios.

Prior to the late 1970's, the period during which the "Hole" over Antarctica was forming, total atmospheric chlorine concentrations were between 1.5 and 2 parts per billion (ppb). The natural abundance of chlorine is 0.6 ppb and today's abundance is approximately 3 ppb.

Under the provisions of the Montreal Protocol as currently written, chlorine concentrations are projected to reach approximately 11 ppb by the year 2075, more than 12 ppb by 2100, and to continue increasing. See Figure VII-5, case 1. A year 2000 global phase-out of only CFCs-11, 12, 113, 114, and 115 would yield chlorine concentrations of more than 8 ppb by 2075, 9 ppb by 2100 and continuing increases. See Figure VII-5, case 2.

If carbon tetrachloride is added to the year 2000 phase-out, chlorine concentrations are projected to increase to more than 5 ppb by 2075 and then level off at that concentration before starting a very gradual downward trend. See Figure VII-5, case 3.

If methyl chloroform is added to the year 2000 phase-out of CFCs and carbon tetrachloride, chlorine concentrations are projected to rise to approximately 4 ppb and, depending on (1) the amount of growth in other, less potent ozone depleting chemicals such as HCFCs, (2) the ODPs and atmospheric lifetimes of these chemicals, and (3) the date by which the production and use of such ozone depleting chemicals are eliminated, atmospheric chlorine concentrations may or may not return to pre-Antarctic "Hole" or even 1985 levels by 2075. See Figure VII-5, cases 4 and 5.



	Clx Levels (ppb)	
	Maximum	2075
(1) Montreal Protocol Reductions; No Methyl Chloroform or Carbon Tetrachloride Controls.	12.30	10.85
(2) CFC Global Phaseout in the Year 2000; No Methyl Chloroform or Carbon Tetrachloride Controls.	9.00	8.30
(3) CFC and Carbon Tetrachloride Global Phaseout in the Year 2000; No Methyl Chloroform Controls.	5.40	5.38
(4) CFC, Carbon Tetrachloride and Methyl Chloroform Global Phaseout in the Year 2000.	3.59	3.02
(5) CFC, Carbon Tetrachloride and Methyl Chloroform Global Phaseout in the Year 2000; HCFC Global Phaseout in the Year 2030.	3.59	2.29

Assumptions: HCFCs Capture 30% of What CFC Market Would Have Been Without Protocol.
100% Global Participation; HCFCs Average an ODP of 0.05.

Figure VII-5

In response to these scientific concerns, various proposals to accelerate the Montreal Protocol's reduction schedule are being discussed by the Parties to the Protocol. For example, the European Community (EC) has suggested that the 1988 date for a 50 percent reduction in consumption of CFCs be accelerated to 1992 and that an 85 percent reduction be required by 1996. Similarly, Canada has proposed a 50 percent reduction by 1995 and an 85 percent reduction by 1998. Most of the Parties to the Protocol have informally agreed to eliminate consumption of CFCs in industrialized countries by 2000.

Provided HCFCs are eliminated early in the next century, an accelerated phase-out schedule, such as that being proposed by the EC or Canada, may eliminate approximately 25 years of elevated chlorine levels. It has been suggested by some industry representatives that such accelerated schedules will result in atmospheric chlorine concentration levels of 2 ppb by around 2050 and to reduce peak chlorine loading by approximately 0.5 ppb, thereby significantly reducing the risk of additional ozone destruction in the Northern Hemisphere and accelerating the date by which repair of the Antarctic ozone "Hole" may be possible.

Accelerated Schedule.—The Act directs the Administrator to implement a phase-out schedule to control and reduce production more rapidly than the schedule set forth in the Act if:

(1) the latest assessments of new or existing information suggests such an accelerated schedule may be necessary to protect human health and the environment;

(2) the Administrator determines, based on the availability of substitutes, that an accelerated schedule is attainable; or

(3) the Montreal Protocol is modified to include an accelerated schedule that is more aggressive than the schedule set forth in the Act.

In keeping with the national policy of eliminating the production and use of "priority list" substances as rapidly as possible and before the year 2000, to the maximum extent practicable, the Administrator is directed to determine no less often than every 18 months whether any of three conditions requiring acceleration of the schedule has been satisfied.

Protection of human health and the environment from the threats of global climate change and destruction of the stratospheric ozone layer ultimately will depend on global action. Nevertheless, unilateral action to strengthen the controls set forth in this Act on domestic production and use of ozone depleting and greenhouse forcing substances may be "necessary to protect human health and the environment", as that phrase is used in this Act.

For example, the United States is the largest producer and consumer of CFCs and other ozone depeleting chemicals. As such, prompt elimination of our contribution to the problem is necessary to protect human health and the environment. The fact that such unilateral action may improve the global environmental situation only by a relatively small percentage is irrelevant. Unilateral action may be "necessary" even in instances where such action, without additional international controls, may not be "adequate."

In addition, unilateral action may be "necessary" to accelerate technological developments or to demonstrate the effectiveness of existing technologies that, in turn, can foster multilateral agreements to implement needed controls. Similarly, unilateral action can, when coupled with appropriate international trade sanctions, be used to convince recalcitrant trading partners to implement needed controls.

The importance of accelerating the phase-out schedule is reflected in the estimate, presented by expert witnesses, that a three to five year delay in the phase-out deadline translates into an additional 20 to 30 years of elevated chlorine levels in the atmosphere. An additional 20 years of elevated chlorine levels presents an unacceptable risk that must be avoided if it is at all possible to do so. It is important to note that no one predicted the massive "Hole" over Antarctica and no one can tell us what surprises may be in store for the future.

Schedule.—In the absence of regulations under the preceding subsection, the Act codifies the reduction schedule currently set forth in the Montreal Protocol for CFCs–11, 12, 113, 114, and 115 (20 percent reduction in 1993 and 50 percent reduction in 1998), adds an additional step: virtual elimination by not later than 2000, and makes the schedule applicable to all fully halogenated chlorine or bromine containing compounds, including the five CFCs listed in the Protocol, the halons, and carbon tetrachloride.

Exception for Medical Purposes.—The Administrator shall authorize the production of limited quantities of substances on the priority list after the year 2000 if such authorization is necessary for medical purposes. If such production would violate the Montreal Protocol, however, the Administrator must abide by the requirements of the Protocol and would be precluded from authorizing such production.

As set forth in the definition of "medical purposes," two conditions must be satisfied as predicates to a finding under this section. First, it must be shown that no safe and effective substitute has been developed and approved for use. Second, the drug, medical device or diagnostic product must be essential, as determined by the Commissioner of the FDA in consultation with the Administrator.

"Medical purposes" may include drugs and drug delivery systems that satisfy the criteria set forth in the Act. For example, effective treatment of acute, chronic asthma currently is dependent on an inhaled dose delivered by a CFC propellant inhaler. Unless a safe substitute exists or until a substitute is developed and approved by the FDA, such a drug delivery system may be found by the Commissioner and the Administrator to be essential. To the extent priority list substances are necessary for the manufacture of essential drug products as, for example, reactants or building blocks in the chemical synthesis of a drug active ingredient, such use may fall within the purview of the Act's conditional exceptions for "medical purposes" or, depending on the facts involved, it may be covered by the Act's definition of "to produce."

Production Phase-Out Exception for National Security.—The President may authorize the production and use of CFC 114 and the three halons, notwithstanding the provisions of this Act, if the President finds that substitutes are not available and such production and use is necessary to protect the national security interests of the United States. If such production or use would violate the Montreal Protocol, however, the President must abide by the requirements of the Protocol and would be precluded from authorizing such production or use.

Control of Other Regulated Substances.—The text of this section has been "reserved" pending the outcome of ongoing discussions and negotiations concerning various proposals to limit growth in production and use hydrochlorofluorocarbons (HCFCs), methyl chloroform, and other ozone depleting substances listed as "other regulated substances" under the Act. A proposal is under development and will be offered as an amendment during Senate consideration of this bill.

There is a growing awareness of the need to control the production and use of these "other regulated substances" to assure that such production and use will not—

(1) contribute to an increase in peak chlorine loading;

(2) reduce significantly the rate at which the atmospheric abundance of chlorine is projected to decrease on the basis of an accelerated global reduction and phase-out of all halocarbon emissions (the base case); or

(3) delay the date by which the average atmospheric concentration of chlorine is projected under the base case to return to a level of 2 ppb, the highest concentration at which repair of the Antarctic ozone "Hole" may be possible.

There is a need for a statutory provision that (1) achieves the three environmental objectives set forth above, (2) recognizes the fact that achieving the goal of eliminating the potent, long-lived CFCs as rapidly as possible is, to some extent, dependent on the near-term availability of HCFCs as intermediate substitutes, and (3) provides the regulated community with the certainty needed to make investment decisions.

Current EPA data suggests the need to treat methyl chloroform separately from HCFCs and to phase-out methyl chloroform as quickly as possible. As stated earlier, the risk to the ozone layer that is presented by a given chemical is determinated by the total amount of stratospheric chlorine contributed by that chemical. Such contribution is determined not only by the atmospheric lifetime of the chemical, but also by the quantity of its emissions and the amount of chlorine it contains.

Even though methyl chloroform has a relatively short atmospheric lifetime, its contribution to current atmospheric chlorine levels is significant (approximately 13 percent, roughly 4 times more than the contribution from CFC-113 or HCFC-22) because it is produced and used in large quantities (roughly equivalent to the total of all CFCs combined) and because it contains three chlorine atoms. Because it has a short atmospheric lifetime, controls on methyl chloroform emissions will reduce stratospheric chlorine levels in the near term more rapidly than controls on any of the CFCs.

National Recycling and Disposal Program.—By July 1, 1991, EPA is to promulgate standards and requirements to (1) reduce the use and emissions of substances covered by this Act to the lowest achievable level, and (2) maximize the recapture and recycling of such substances.

Such standards and requirements are expected to achieve, among other things, a reduction of at least 50 percent in the use of priority list substances in the manufacture of products in which such substances are used as solvents or blowing agents. Similarly, releases associated with training, testing, leakage, or accidental discharge of such substances from fire prevention or extinguishing equipment should be reduced by at least 90 percent.

As of January 1, 1992, it will be unlawful for any person maintaining, servicing, repairing or disposing of a household appliance or a commercial refrigeration or air-conditioning unit to knowingly vent, release, or dispose of any substance used as a refrigerant and covered by this act in a fashion which permits such substance to enter the environment. Exceptions to this prohibition are included for de minimis releases associated with good faith attempts to recapture, recycle and safely dispose of such substances. The standards and requirements that EPA is required to promulgate by July 1, 1991, should include provisions to foster implementation of this prohibition, including guidance on what constitutes "de minimus releases" and "good faith".

Prior to January 1, 1994, EPA is to promulgate standards and requirements for the safe deisposal of substances covered by this Act, including provisions that:

—mandate removal of these substances prior to disposal of products containing these substances in bulk, such as refrigerators and air-conditioners that contain refrigerants covered by this Act;

—prohibit the manufacture or distribution of products containing substances covered by this Act unless such products are equipped with a servicing aperture that allows recapture during service and repair; and

—reduce, to the maximum extent practicable, the release of these substances during disposal of products in which the substances are incorporated.

An example of a product in which a substance covered by this Act is incorporated as an inherent element is rigid foam insulation. It has been suggested that regulating the disposal of rigid foam insulation would produce only marginal environmental benefits. This provision authorizes the Administrator to promulgate an exception from the disposal regulations if the Administrator determines that regulating the disposal of such products would produce only marginal environmental benefits. An important factor for the Administrator to consider is whether, as has been suggested by industry representatives, the unregulated disposal of rigid foam insulation results in only de minimis releases of CFCs.

The Administrator is directed to promulgate regulations concerning manufactured substances to assure that the greenhouse forcing potential of such substances, including those produced as CFC substitutes, are considered by manufacturers and users and that the problem of global climate change will not be exacerbated by the use of such substances. The greenhouse threat of such substances must be examined and considered both from the perspective of direct radiative effect when such substances are emitted into the atmosphere and from the perspective of indirect effects of substances that, for example, result in a significant increase in energy usage and resulting increases in carbon dioxide emissions.

Motor Vehicle Air-Conditioning.—As of January 1, 1992, any person who services motor vehicle air-conditioning systems for consideration must use extraction and reclamation equipment that meets standards set by the Society of Automotive Engineers.

The sale of do-it-yourself recharge canisters of motor vehicle refrigerants to persons other than professionals in compliance with the requirement to use extraction and reclamation equipment will be prohibited as of January 1, 1992.

The Administrator is directed to promulgate regulations to assure that, beginning with model year 1994, not less than 25 percent of the motor vehicles that are manufactured in or imported into the U.S. and are equipped with passenger compartment air-conditioning systems must be equipped with systems that are not dependent on CFC-12 or comparably potent ozone depleting chemicals. Beginning with model year 1996, not less than 50 percent of such vehicles must be so equipped. Such regulations shall include provisions to assure that the requirements of this Act and the intent of this section are not circumvented by, for example, the continued sale and installation of CFC-12 dependent air-conditioning systems for motor vehicle passenger compartments by persons other than manufacturers, distributors or importers of motor vehicles.

If technological development problems will prevent the sale or installation of alternative air-conditioning systems prior to the effective dates of this provision, the Administrator is to report such fact to the Congress and recommend alternative effective dates.

Nonessential Consumer Products Containing Chlorofluorocarbons.—Effective one year after enactment, the sale and distribution of nonessential products containing priority list substances, such as CFC propelled plastic party streamers and noise horns, CFC cleaning fluids for noncommercial electronic and photographic equipment and other products determined by the Administrator to be nonessential, will be prohibited.

Effective January 1, 1994, the sale and distribution of aerosals (other than medical devices) and plastic foams (other than insulating foams) that use other regulated substances listed under this Act will be prohibited. The purpose of this subsection is to statutorily prohibit nonessential, dispersant uses of other ozone depleting and greenhouse forcing substances, such as HCFCs. EPA may issue regulations restricting or prohibiting one or more other uses of such substances if, for example, it is determined that the use of alternative chemicals or processes is feasible and preferable. Relevant factors in making such determinations include the relative toxicity, ozone depletion potential, radiative absorption capacity and energy efficiency of such alternatives.

Certification of Equivalent Programs.—Effective one year after enactment, the importation of priority list substances in bulk or in products will be prohibited unless EPA certifies that the country of origin is a party to and in compliance with the Montreal Protocol. Effective July 1, 2000, such importation will be prohibited unless EPA certifies that the country of origin is implementing a reduction and phase-out program as stringent as that set forth in this bill.

At the same time, to prevent persons subject to U.S. jurisdiction from transferring technology or investing in facilities to produce priority list substances in countries that are not so certified, the President is directed to prohibit such technology transfers and investments within one year of enactment. Similarly, the President is directed to prohibit technology transfers and investments in facilities that produce products that will create or expand the demand for priority list substances in such countries.

The statutory directive that the President prohibit direct or indirect investments by any person in facilities designed for or capable of *using* priority list substances in nations not certified under this section is conditioned upon a determination by the President that substitute products or processes exist that do not require the use of such substances. For purposes of this section, a substitute "exists" when it becomes commercially available.

When such substitutes are available, the justification for overseas investments in facilities that continue to rely on priority list ozone depleting substances ceases to apply, especially where such investments are proposed to be made in nations that are not parties to and in compliance with the Montreal Protocol. The President must make the requisite determinations by January 1, 1992, and every two years thereafter.

In addition to examining the issue of the availability of substitutes, the President is directed to consider whether the proposed investment will increase use of priority list substances in nations that are not certified under this section. This language has been added to give companies such as those in the electronics industry the flexibility to modify current overseas investments and to upgrade overseas facilities by, for example, investing in new, improved product lines. If such investments do not increase overall use of priority list substances in those countries as a result of, for example, the elimination of old product lines, the President may allow such investments to be made.

Labeling.—By January 1, 1992, and every two years thereafter, the Administrator is directed to determine whether safe substitutes that do not rely on priority list substances exist for each class of products and, for each class of products for which such substitutes do exist, to promulgate regulations requiring the labeling of products that contain or are made with priority list substances. For purposes of this section, a substitute "exists" when it becomes commercially available.

The Administrator is authorized to issue labeling regulations for products containing or made with other regulated substances but is not required to do so by a date certain.

Requiring labels will serve two purposes: (1) they will alert consumers to the fact that they are choosing a product that contains or uses a substance that destroys the ozone layer and contributes to the greenhouse effect; and (2) for products containing such substances, labels will alert consumers to the fact that they must take care in handling and disposing of such product to avoid emitting such substances to the environment.

The statutory directive to promulgate regulations requiring labels is limited to instances where the information contained in the label may affect consumer choice. If substitute products or processes exist that do *not* contain or depend on use of priority list substances, similar products that *do* contain or are made with priority list substances must bear the appropriate label. The Administrator is authorized to require labels for other products to, for example, alert consumers to potential disposal problems, but is not required to do so by a date certain

In the case of household appliances for which energy labels are required under, for example, 42 U.S.C. 6294, any labeling requirement imposed under this section may be satisfied by adding the appropriate language to the energy label.

Safe Alternatives Policy.—To the maximum extent practicable, substances covered by this Act are to be replaced with alternative substances and processes that reduce overall risk to human health and the environment.

The Administrator is directed to recommend Federal research programs and other activities to assist in the identification of safe alternatives; and to examine Federal procurement practices and recommend measures to promote a transition by the Government to the use of safe substitutes.

The Administrator is also directed to collect health and safety studies from producers of chemical substitutes. Not less than 60 days prior to introducing a chemical substitute, the producer of such chemical must notify EPA.

Federal Enforcement.—The Administrator is authorized to issue compliance orders, assess administrative civil penalties up to $25,000 per day of noncompliance for each violation, and commence civil actions in court.

Criminal penalties (up to 2 years imprisonment and fines as set forth in the uniform criminal code) and civil penalties (up to $25,000 per violation) are provided for violations of the Act. The list of "knowing" activities subject to criminal penalties are specified in the Act.

Judicial Review.—Review of any final action under this Act may be had in the Circuit Court of Appeals for the Federal judicial district in which the petitioner resides or transacts business.

Citizens Suit.—Citizen suits are authorized in the same manner as in most environmental statutes.

Separability.—Invalidation of a portion of this Act will not affect the balance of the Act.

Relationship to Other Laws.—This title does not affect the authority of the Administrator under any other provision of the Clean Air Act or the Toxic Substances Control Act nor does it affect the authority of other agencies. The authority of States and political subdivisions may be affected when Federal regulations are in effect.

This provision is modeled on the language of section 159(b) of the current Clean Air Act (one of the sections being repealed and replaced by this Act) with the addition of a waiver provision modeled after section 209(b) of the current Clean Air Act. The preamble to EPA's final rule published on August 12, 1988, correctly noted that the language of section 159(b) does *not* mean that the adoption of *any* Federal regulation of any substance, practice, process, or activity preempts the entire field of stratospheric ozone regulation.

Authority of Administrator.—The Administrator is authorized to prescribe such regulations as may be necessary to carry out this title.

This section is intended, in addition to fostering implementation of new requirements set forth in this title, to preserve the authority and responsibility of the Administrator as set forth in section 157 of the existing Clean Air Act. As stated in that section of the law, if in the Administrator's judgment any substance, practice, process, or activity may reasonably be anticipated to affect the stratosphere, especially ozone in the stratosphere, and such effect may reasonably be anticipated to endanger public health or welfare, the Administrator shall promptly promulgate regulations respecting the control of such substance, practice, process, or activity.

Grants.—This section authorizes a grants program for the purpose of stimulating development of technologies, processes and safe substances that can be substituted for technologies, processes and substances which contribute to ozone depletion and climate change. The grants authorized by this section are not limited to domestic grants. Technical support for developing countries that are seeking to avoid exacerbating the problems of ozone depletion and global climate change is authorized by this section.

In awarding grants, the Administrator should consider overall climate impacts and, in addition to other factors, the contributions that alternative energy and conservation technologies can make to solving the problem of global climate change. Consideration should be given to emerging technologies which do not rely on fossil fuels as an energy source as well as technologies which increase the efficiency of converting fossil fuels to other forms of energy and reduce emissions of carbon dioxide and other greenhouse gases.

The appliance industry recently announced the formation of the Appliance Industry-Government CFC Replacement Consortium, Inc., to find replacement substances for home refrigeration use. Projects of this kind are critical and should be encouraged by the government. Support for such work is one of the primary purposes of the grant program. Similarly, there is a need to develop safe, economical disposal technologies for foam insulation made with CFCs as well as for CFCs used in refrigerators as refrigerants. EPA should use the grant program to initiate immediately such research and development.

PART B—METHANE ASSESSMENT

Objective and National Goal.—The objectives of this part are to identify and analyze options to reduce the risks of tropospheric ozone formation and global climate change by: reducing methane emissions enough to keep the atmospheric concentrations from increasing; and promoting additional analyses of (1) the factors causing methane concentrations to increase, (2) the sources of methane emissions, (3) the opportunities for reducing such emissions, and (4) the relationships among methane and other atmospheric pollutants.

The national goals are to: reduce methane emissions in the U.S. and other countries; stimulate international agencies to fund projects in developing countries that will reduce methane emissions; and provide data in support of international efforts to reduce methane emissions.

In early November 1989, numerous countries, including the United States sent high level officials to attend a Ministerial Conference On Atmospheric Pollution and Climate Change in Noordwijk, the Netherlands. At the conclusion of the conference on November 7th, the United States joined in issuing the Noordwijk Declaration. Paragraph 23 of the Declaration recommends that the development and implementation of specific means of limiting the atmospheric concentrations of greenhouse gases (other than carbon dioxide and CFCs which are addressed in other paragraphs of the Declaration) should be energetically pursued. Paragraph 16 of the Declaration recognizes the need to stabilize emissions of greenhouse gases not controlled by the Montreal Protocol.

The primary greenhouse gas covered by paragraphs 16 and 23 of the Noordwijk Declaration is methane. This portion of the Act authorizes and directs the Federal government to conduct studies that will enable the United States to fulfill the pledges made at the Noordwijk meeting.

Information Collection.—For purposes of completing the studies required by this Act, the Administrator is authorized to collect information from persons responsible for the release of methane during manufacturing, processing, resource recovery or distribution, or waste management. The agency's need for this information should be considered carefully and, given the difficulties inherent in reporting on sources as diverse as agriculture and human activities, the authority to collect such information should be used advisedly.

To the extent information concerning methane releases is already reported to other Federal or State agencies and is available to the Administrator, duplicate reporting requirements are to be avoided. The Administrator is authorized to use survey techniques or to rely on reasonably accurate estimates of emissions and should not seek to establish an extensive new monitoring system.

Economically Justified Actions.—By September 30, 1990, EPA, in consultation with NOAA, NASA and other relevant Federal agencies, is to report to Congress on measures that could reduce methane emissions and are economically justified with or without consideration of environmental benefits.

Domestic Methane Source Inventory and Control Options.—By September 30, 1990, EPA, in consultation with NOAA, NASA and other relevant Federal agencies, is to submit to Congress reports, including inventories of emissions associated with the following activities in the U.S.:

—natural gas and coal extraction, transportation, distribution, storage, and use;
—management of solid waste;
—agriculture; biomass burning; and
—other activities deemed by the Administrator to be significant.

By September 30, 1990, EPA, in consultation with NOAA, NASA and other relevant Federal agencies, is to submit a plan to Congress that could be implemented to stop the growth in atmospheric concentrations of methane from activities and sources in the U.S. and shall include an analysis of U.S. programs that could be used to induce developing countries to implement measures that will reduce methane emissions.

International Studies.—By September 30, 1990, EPA, in consultation with NOAA, NASA and other relevant Federal agencies, is to submit to Congress reports on methane emissions from other countries and on the potential for preventing an increase in atmospheric concentrations of methane from activities and sources in other countries.

Natural Sources.—By September 30, 1992, EPA, in consultation with NOAA, NASA and other relevant Federal agencies, is to submit to Congress reports on methane emissions from natural sources such as forests, tundra, and wetlands, and on the changes in emissions that may occur as a result of increased atmospheric concentrations of carbon dioxide.

HEARINGS

The Subcommittee on Environmental Protection held 10 days of hearings this year on the subjects of nonattainment issues, air toxics, acid rain issues including health effects, CFCs, and municipal waste incinerators. Testimony was received from the Environmental Protection Agency, State and local agencies, members of the medical profession, industry representatives, and environmental groups.

MARKUPS

The Subcommittee on Environmental Protection held four days of markups on October 19, 26; November 7, and 14, 1989. The full committee considered the subcommittee recommendations on November 16, 1989 and also ordered the bill reported on the same day.

ROLLCALL VOTES

Section 7(b) of rule XXVI of the Standing Rules of the Senate and the rules of the Committee on Environment and Public Works require that any rollcall votes taken during the committee's consideration of the bill be noted in the report.

Several rollcall votes were taken, the results of which were publicly announced during the open meetings held to consider this bill. The tabulation of those votes is available from the committee's files.

On November 16, 1989, the committee ordered S. 1630 reported with an amendment in the nature of a substitute by a vote of 15 to 1 with Senators Burdick, Moynihan, Mitchell, Baucus, Lautenberg, Breaux, Reid, Graham, Lieberman, Chafee, Simpson, Durenberger, Warner, Jeffords, and Humphrey voting to report the bill. Voting in the negative was Senator Symms.

EVALUATION OF REGULATORY IMPACT

Section 11(b) of rule XXVI of the Standing Rules of the Senate requires publication in the report of the committee's estimate of the regulatory impact made by the bill as reported. That estimate follows:

Much of the bill imposes requirements which are already within the discretion of the Administrator of the Environmental Protection Agency. Many provisions are in fact necessitated by the failure of the agency and others, to completely execute the existing requirements of law.

Some provisions of the bill will incrementally increase the burden of regulations on industry. Few of these industries, however, are not already subject to Federal or other regulation. These provisions, and the requirements for State and local governments, are discussed extensively in the "Discussion of Provisions" above. The bill should result in no changes with respect to the privacy of individuals.

COST OF LEGISLATION

Section 403 of the Congressional Budget and Impoundment Control Act requires that a statement of the cost of the reported bill, prepared by the Congressional Budget Office, be included in the report.

A copy of S. 1630, as ordered reported, was furnished, in timely fashion, to the Congressional Budget Office for a cost analysis, as required. However, due to the volume and number of subjects addressed in the bill, the Budget Office was unable to furnish the cost analysis by the date the Committee ordered the bill and report to be filed with the Senate.

The cost analysis, when received, will be printed in the Congressional Record.

ADDITIONAL VIEWS OF SENATOR MITCHELL

I support the Clean Air Act Amendments of 1989, as reported by the Environment and Public Works Committee. The Committee has labored long and hard since 1982 on the public health crisis of air pollution. The Clean Air Act has not been amended since 1977—longer than any of our other environmental statutes. The Act needs modification to keep it current.

The bill is comprehensive. It addresses the problems of acid rain, urban smog and failure of areas to meet national air quality standards, air toxics, municipal incinerators, global warming and chlorofluorocarbon emissions that deplete the earth's protective ozone layer.

The Committee has held 65 days of hearings and 45 days of markup on clean air since 1980. There is a full record of the history of the Committee's clean air activities. After a decade of deliberation, the time has come to act.

The bill reflects the decision of the Committee members to directly address our air pollution problems. This bill makes many tough choices. A timit approach will continue the litigation and delay that occurs under the existing Act, while children and the elderly continue to suffer the adverse health impacts of air pollution.

There is no perfect solution to our air pollution problems. But the quest for perfection has too often been used to justify no action at all. Further delay is not acceptable. According to a draft report, "The Health Costs of Air Pollution", by the American Lung Association, health care costs associated with mobile source emissions may range as high as $93 billion per year. According to that draft report: "The highest overall estimate from any of the studies reviewed predicted $432 billion in annual health costs from exposure to sulfate pollution, assuming "worst case" dose-response correlations between sulfate pollution and premature deaths." These are at the upper limits of the cost estimates, but it is significant that any cost estimate would be this high. This legislation, if enacted, would dramatically reduce these health cost estimates.

There is one issue on which I must express my concern. During Committee markup, an amendment to the radionuclide section of the air toxics title was offered and accepted. The authors of that provision states they intended only to avoid dual regulation of the same sources of radionuclides by both Environmental Protection Agency and the Nuclear Regulatory Commission. Both the EPA and the NRC supported this change.

However, one consequence of this change may have been to preeempt States from exercising the jurisdiction they had under the Clean Air Act to adopt radionuclide standards that are more protective than those required by the Federal Government. This is because EPA's authority to regulate radionuclides under the Clean

Air Act was eliminated. The Clean Air Act is not preemptive in this regard, as the legislative history clearly demonstrates.

Due to the amendment adopted during Committee markup, EPA only has authority to regulate radionuclides under the Atomic Energy Act. Unfortunately, that Act is preemptive. The effect of this change is to preempt States from establishing their own standards for radionuclide emissions.

Now is not the time to make such a change. For example, it was reported on December 20, 1989, that a panel of the National Research Council concluded that the risks from low levels of radiation exposure may be three to fourteen times greater than previously estimated. If the panel's analysis is correct, then cancer deaths from the Chernobyl nuclear explosion in the Soviet Union in 1986 would produce 70,000 cancer deaths, rather than the 17,400 previously estimated.

Members of the research panel indicated that this new data may cause government standards for radiation exposure to be tightened. If the Federal government fails to take this step, I do not believe that States should be barred from adopting standards that they believe are needed to protect the public health.

My position on preemption has been clear and consistent. I do not beleive that the Federal government should deny States the authority to protect the public health and the environment beyond the level of protection required by the Federal Government.

GEORGE J. MITCHELL.

ADDITIONAL VIEWS OF SENATOR LAUTENBERG

I want to emphasize my strong support for S. 1630, the clean air legislation adopted by the Environment Committee. The American people have made clear their desire to have clean air—air which is safe to breathe, which does not harm trees, lakes and coastal waters, and which doesn't pose a threat of a Bhopal type accident in the United States. S. 1630 provides the legislative underpinning to achieve these goals.

The Clean Air Act authorization for appropriations expired in 1981 and since then the Congress has neither reauthorized nor strengthened the Act. This is primarily the fault of the Reagan Administration which first tried to weaken the Act and when that failed, opposed every effort to strengthen the Act.

To his credit, President Bush has made passage of clean air legislation a priority. This is a major advance over the Reagan Administration position, and has helped provide the impetus for Congressional action during this Congress. And the President's acid rain proposal represents a serious effort to reduce sulfur dioxide.

But simply being better than the Reagan Administration, which was so hostile to environmental values, is not enough. Unfortunately, the President Bush's proposal fails to provide the tough programs we need to address nonattainment and air toxics. And even his acid rain proposal inadequately controls emissions of oxides of nitrogen which play an important role in the generation of acid rain. S. 1630 provides the tough, comprehensive program we need.

Air toxics present a significant threat to the health of our citizens and to the environment. Air toxic emissions are too high—at least 2.7 billion pounds in 1987 according to the Right-To-Know data. And emissions are significantly higher when we account for sources of emissions not included in the Right-To-Know program.

Air toxic emissions pose significant threats to public health. They are believed to cause thousands of additional cancer cases a year and other adverse health effects. And they are adversely affecting the Great Lakes and coastal waters.

There is agreement even by the Administration that the existing air toxics program isn't working. So we need a program which will protect public health and the environment from routine emissions of air toxics.

In addition, some chemicals are extremely hazardous and if not handled properly, pose significant risk of accidents. According to EPA, there have been over 300 deaths and almost half a million people evacuated between 1982 and 1986 as a result of chemical accidents. And at least 17 of these events had the potential for more damage than occurred at Bhopal.

The President's bill falls short of protecting public health and the environment from air toxics. It provides for a balance of health and economic considerations. This standard fails to protect public health. The bill also ignores the environmental threats posed by these pollutants. And the President has proposed a minimal program for chemical accidents.

S. 1630, which builds on the legislation Senators Durenberger, Breaux, and I introduced, addresses these shortcomings. It establishes a standard to protect public health and does not allow for the consideration of costs as does the President's bill. S. 1630 also requires that emissions limitations protect the environment. It would require EPA to establish a program to monitor atmoshperic deposition of toxics into the Great Lakes and, of particular concern to my state, into coastal waters.

And the bill establishes a strong chemical accident safety program. It creates an independent chemical safety board, like the National Transportation Safety Board, to ensure that chemical accidents will be subject to thorough investigations. It requires companies using more than threshold amounts of certain acutely hazardous substances to prepare hazard assessments. It also authorizes EPA to require the preparation of risk management plans which would be designed to detect and prevent the potential for accidental releases.

We also need to establish a tough, comprehensive program to rid our air of the ozone, carbon monoxide and particulate pollution which plague our nation.

These pollutants threaten the health of our citizens and our environment. Roughly 150 million Americans live in areas where ozone levels exceed the existing ozone standard. Some citizens have been exposed to ozone levels which exceed the standard established by the Occupational Health and Safety Administration to protect the health of factory workers. This, even though the ozone standard was supposed to be achieved by 1977. And unless tougher measures are adopted to reduce the precursors of ozone, volatile organic compounds and nitrogen oxides, ozone pollution is likely to worsen because of the substantial increase in the use of motor vehicles in the future.

Millions of Americans also live in areas that fail to meet the carbon monoxide and particulate public health standards.

Violations of the ozone health standard can result in lung function impairment, chest pains, shortness of breath, coughing, nausea, throat irritation, increased susceptibility to respiratory infections and in high enough levels, death. Young children are particularly susceptible to both acute and permanent effects of ozone pollution. Ozone pollution also can result in adverse effects on crops, forests and materials. Carbon monoxide robs the body of needed oxygen and violations of the health standard can result in reduced work capacity and fetal effects. Particulate matter can produce a range of effects from temporary reductions of lung function and increased respiratory symptoms to aggravation of existing respiratory and cardiovascular disease, cancer and premature death.

In 1988 in New Jersey, the ozone standard was violated 45 days, the highest number of violations in five years, with levels of 68 percent higher than the ozone standard. The entire state is classified as a nonattainment area for ozone. Northern New Jersey has carbon monoxide levels which exceed the existing standard by over

50 percent. And this despite having some of the toughest air pollution controls in the nation. Moreover, New Jersey would be in noncompliance even if all emissions in New Jersey were eliminated for a day because of ozone and ozone precursor pollutants from areas upwind of New Jersey.

Unfortunately, President Bush's proposal fails to call for the necessary measures. According to the State and Territorial Air Pollution Program Administrators (STAPPA), the provisions of the President's bill ". . . fall far short of what is needed to expeditiously attain and maintain the National Ambient Air Quality Standard for ozone." A similar finding was made for the President's carbon monoxide control program. And concerning the President's program to control emissions from motor vehicles, the largest source of both ozone and carbon monoxide pollution, STAPPA concluded that the program ". . . is inadequate and represents the weakest part of the Administration's clean air proposal."

S. 1630 includes strong measures to bring the nation into attainment with air pollution standards. It also includes technology forcing standards to reduce automotive emissions. Auto emissions result in 50 percent of the nation's hydrocarbons, and 75 percent of its carbon monoxide and are believed to be responsible for 50 percent of all cancer deaths caused by air toxics. Despite significant reductions in emissions from cars, remaining emissions still cause a large part of the nation's ozone, carbon monoxide and air toxics problems. And vehicle miles traveled are growing rapidly. This means we need continued reductions in auto emissions which will be achieved by the bill's "second-round" standards if we are to achieve the clean air public health standards.

Finally, and most importantly to my state, S. 1630 includes a strong program which I advocated to regulate pollutants transported form upwind states. Attainment areas within the Northeast Transport Region would be required to adopt reasonably available and cost-effective controls.

We also need to be concerned about municipal solid waste incineration. Most states have incineration facilities for municipal solid waste either on line or planned. In 1986, 6 percent of municipal solid waste was incinerated and this figure is expected to rise sharply. While the choice of incineration is a state and local decision, the Federal Government has a role to ensure that air emissions and ash disposal do not pose threats to public health and the environment. S. 1630 includes a strong program to control emissions from incinerators and ash disposal.

There is one provision in the bill which I do strongly oppose. This concerns the mandatory use of gasohol as an oxygenated fuel within carbon monoxide non-attainment areas.

As reported by the Committee, this provision could have significant, counter-productive impacts. The provision is a mandate for a greatly increased use of ethanol-based fuel—gasohol. While the use of gasohol can result in the reduction of carbon monoxide levels, its increased volatility can also contribute to the ozone problem faced by many communities.

The Committee provision mandates, through environmental legislation, a greatly increased market share for gasohol, which is already highly subsidized through several sources, including an exemption from six cents of the nine cent Federal gas tax. This exclusion already costs the Federal Highway Trust Fund (HTF) approximately $500 million in revenues annually. In turn, the mass transit account of the HTF, which is also supported by the gas tax, suffers. The impact on revenues from the Committee provision has been estimated at between $300 million to $1 billion annually. Therefore, through an expanded, mandated use of gasohol, Federal support for mass transit, which is so vital to the efforts of areas like northern New Jersey to meet Clean Air goals, would be reduced.

Much of this problem could be alleviated by allowing other carbon monoxide-reducing fuels to be used by non-attainment areas. That was the intent of an amendment I offered during Committee consideration. By setting a minimum oxygen content of fuels during winter months at 2.7%, other fuels, such as methyl-tertiary-butyl-ether (MTBE), could be used in non-attainment areas. MTBE is not exempt from the gas tax, and therefore does not have the draining impact on public transportation and highway spending. Importantly, while providing virtually the same carbon monoxide reduction benefits as gasohol, MTBE also can reduce hydrocarbons, and does not contribute to the ozone problem.

As stated by the State and Territorial Air Pollution Program Administrators, any oxygenated fuels requirement should be "fuel-neutral," not favoring the use of one beneficial fuel over another. Unfortunately, the Committee provision does not meet this test. In falling to do so, I believe its environmental benefits are outweighed by its disadvantages. Consequently, I will be working to improve this provision before the Senate completes action on this clean air bill.

But overall, S. 1630 represents a tough, comprehensive response to our nation's air pollution problems.

FRANK R. LAUTENBERG.

ADDITIONAL VIEWS OF SENATOR SIMPSON

I was very pleased that the Senate Environment Committee was able to report a clean air bill that was somewhat more moderate than past committee versions: I believe that the chairman of the full committee and the chairman of the subcommittee with jurisdiction over clean air, Senators Burdick and Baucus genuinely seek to have clean air legislation approved by the full Senate and the Congress this year. For that reason they have chosen to take a more common sense approach with regard to the acid rain problem. I find that encouraging.

I believe that there still may be some necessary changes to the acid rain provisions. While I support a 10 million ton reduction, with a least cost approach and maximum flexibility, I am concerned that the emissions cap combined with uncertainties in the allowance trading system, may be a problem. I am also concerned that the so called "clean States" provision may not be adequate to protect States that have already cleaned up their emissions from additional clean up requirements. It seems to me that we should be considering a State's overall emissions and not how much "scrubbed capacity" the State has.

The repeal of percentage reduction is a welcome addition to this clean air re-write. However, we need to review closely the legislative history from past incursions into this area in order to be certain we are actually repealing this onerous and unfair requirement. To that end, I offered an amendment altering the Best Available Control Technology (BACT) provisions of the Clean Air Act in order to ensure that scrubbers are not mandated in every case.

I am pleased to see that the committee developed a strong ozone non-attainment provision, but I am somewhat concerned about automobile tailpipe standards that may be slightly over aggressive. We will certainly have a great deal of debate on those provisions during Senate consideration and in the conference committee consideration.

A great deal of attention has been paid to the acid rain provisions and to the non-attainment provisions in this bill with little attention focused on the hazardous air pollutant section. After members of the full Senate thoroughly review the bill they may determine a serious need for some amendments to the hazardous air pollution section that really has not received much review by the Environment Committee or the Congress as a whole.

There is one issue that was not addressed by the committee that may require some debate on the Senate floor. This is in regard to a concern that some Senators have about the tremendous amount of toxic air pollutants that come from large western forest fires. Two years ago we saw over half of Yellowstone Park go up in smoke and the smoke contained tremendous quantities of the potent carcinogen benzo-a-pyrene. The public in the western states was exposed to large quantities of this pollutant and it seems that the National Park Service and the U.S. Forest Service have paid little attention to the public health consequences of their fire burning policy.

I look forward to a spirited clean air debate on the Senate floor. I have often said we will not be able to complete action on clean air until Senators who are not on the committee can participate in formulating this legislation. That will surely come to pass in 1990.

ALAN K. SIMPSON

ADDITIONAL VIEWS OF SENATOR WARNER

The Committee on Environment and Public Works has completed an intensive period of consideration of amendments to the Clean Air Act. I joined an overwhelming majority of the Committee in voting to report this legislation to the full Senate. While the bill contains many important provisions that will go a long way towards improving our air quality, I do feel that more work needs to be done to improve the legislation. In the coming weeks, I intend to participate actively in the development of amendments to the legislation that would make those improvements.

The scope of the Committee bill is extremely far-ranging, both in the environmental benefits it seeks to bring about, and the effects it will have on the American economy and lifestyle. One portion of the bill provides for a renewed attack on ozone and carbon monoxide pollution in our urban areas. Other portions call for new regulation of acid rain and toxic air pollutants, as well as controls on emissions from municipal incinerators and reductions in the use of chlorofluorocarbons.

Set out below are several issues that in my view, deserve further attention, either in a Committee amendment or on the Senate floor. The list of concerns is not an exhaustive one, but merely a description of what I consider to be the areas in which the greatest attention is needed.

ACID RAIN PROVISIONS

During Committee consideration of clean air legislation, I spent a significant amount of time attempting to develop amendments to the acid rain portion of the legislation. As I indicated to my Committee colleagues, I was and remain concerned about provisions requiring any new unit to offset all of its emissions through further reductions or the purchase of allowances from other units. I fear that this requirement will place severe restrictions on the ability of my State of Virginia and many other States to grow in a reasonable manner and to have access to an adequate energy supply to support that growth.

In an attempt to address this concern, I offered an amendment to the acid rain section that would allow for some reasonable growth in an environmentally responsible manner, by allowing only the cleanest plants to grow. Although I withdrew this amendment during the Committee mark-up, I hope to offer it or some alternative amendment during Senate floor consideration.

Specifically, the amendment I offered in Committee would grant new plants emitting at a level of 0.25 pounds per million Btu's—the "super-clean" plants—an exemption from the requirement that they obtain allowances from the years 2000–2010. This would give the cleanest units a grace period to operate and to adjust to the allowance system. It is hoped that, by the year 2010, those units would be able to join the system and obtain any allowances that would be needed after that time.

My amendment would not only address the serious problem of reasonable growth, but it would also address two other matters of serious concern to me. First, the net effect of the emissions offset requirement as it now stands is to drive some independent power procedures, non-utility generators, and low-emitting utility systems away from coal. This is of particular concern in Virginia, since we produce low-sulfur coal that can be used to further the goal of reducing sulfur dioxide emissions. Decreasing the use of cleaner coal should also be of concern to all members of the Committee and the full Senate, because we are turning away from one of the few plentiful sources of energy we have right here in the United States.

Lastly, my amendment would correct what I see as an anamolous result that the offset requirement would create in Virginia and other states. Old Dominion Electric Cooperative, which serves over 300,000 consumers in Virginia, Maryland and Delaware, has under contract and is proceeding to develop an 800 megawatt coal-fired electric generating station, that will supply much-needed power in the region.

Old Dominion's plant will be built using Best Available Control Technology. In fact, of the total investment of $868 million in the plant, more than $178 million will be invested for pollution control equipment, so that the plant will operate at an emission rate of .25 lbs. per million BTUs. And yet, due to the uncertainties of the allowance system, Old Dominion may not be able to obtain construction financing for this clean project. In my view, the Congress should be encouraging the construction of such clean plants in Virginia and other States, and I will seek to amend the acid rain portion of this legislation on the floor to allow such construction to go forward.

The concerns that my amendment was designed to address have been expressed by 18 of my Senate colleagues in a November 11, 1989 letter to Senator Baucus. In that letter, those Senators stated their hope that the Senate not adopt an acid rain bill that would unnecessarily impede the economic growth of various States.

I am pleased that 12 members of the Senate Energy and Natural Resources Committee have also recognized the threat to reasonable growth presented by the offset provision. In a letter of November 16, those Senators called upon Chairman Johnston to hold hearings on the impact of the acid rain provisions, among others, on this country's energy policy.

As my colleagues pointed out, "these and other provisions under consideration have major economic and social implications for all Americans." I am confident that these hearings, which I now understand Senator Johnston has agreed to hold promptly upon our return in January, will contribute much to the debate in the Senate.

Air Toxics Provisions

Unfortunately, the Committee failed to consider an important provision contained in the air toxics section of S. 1490, clean air legislation proposed by President Bush, sponsored in the Senate by Senator Chafee, and cosponsored by myself and many other Senate colleagues. That provision would require the Environmental Protection Agency to undertake a three-year study of the emissions coming from fossil fired utility boilers. It is my impression, and apparently that of the President and his advisors at EPA, that in the combustion of any fossil fuel, extremely small amounts of six or eight toxic substances may be emitted from these boilers. I have been advised that they are merely trace amounts, but when aggregated they may at some times, but not at others, exceed the bill's aggregate tonnage proscription.

The utility industry has testified that the cost to control these minuscule emissions would be extremely expensive. In light of these facts, the full Senate should certainly adopt the President's three-year study proposal to determine the nature of utility boiler emissions and whether their control is warranted.

OZONE NONATTAINMENT PROVISIONS

I am seriously concerned about the requirement in the nonattainment title that all States from Maine to Virginia be part of an Ozone Transport Region. Although portions of Virginia are out of attainment with ozone standards, many rural areas are not, and do not contribute to problems in other States.

It is my view that those areas in Virginia that are in attainment and do not contribute to the problems of other States should not be subjected to the same requirements as serious nonattainment areas. I intend to consider changes in the legislation to ensure that these areas will not be unfairly penalized.

OTHER PROVISIONS

There are many other provisions in this legislation that deserve another look. In particular, it is my view that the Committee did not give the sections on permits and enforcement sufficient consideration before approving them in full Committee mark-up. No hearings were held on these sections, and only the shortest amount of discussion occurred among members of the Committee. These provisions deserve more thorough consideration on the Senate floor.

In addition, I feel that the Committee did not give sufficient consideration to the costs of the legislation. I applaud the Minority Leader's November 15 letter to the Majority Leader requesting that, before debate on this bill begins, "detailed cost estimates of all titles of the bill be made [for] all Senators on a State-by-State basis." In the last Congress, over 30 Senators joined in requesting that a similar study be done on S. 1894 by CBO, CRS and OTA. It is imperative that this be done prior to our consideration of this bill on the floor in order that we can adequately assess for our constituents the cost which we are asking them to bear for cleaner air.

JOHN W. WARNER.

MINORITY VIEWS OF SENATOR SYMMS

CONTENTS

Page
Executive summary ... 417
I. Introduction ... 418
    A. Allow freedom to work ... 419
    B. Adhere to sound science ... 420
    C. Permit local flexibility ... 420
II. Attainment of ambient standards ... 422
    A. How to measure attainment ... 422
        1. Design value ... 422
        2. Understanding the nature of the problem ... 423
            (a) Biogenic hydrocarbons ... 423
            (b) Aberrations in weather ... 423
        3. Advance planning program ... 427
    B. New federally-imposed requirements ... 427
        1. Fee structure ... 427
            (a) $2.00 auto registration fee ... 427
            (b) EPA budget add-on fee ... 428
            (c) $5,000 "sanction" fee ... 428
        2. Stage II vapor recovery ... 429
        3. Transportation control measures ... 430
        4. Offset requirements ... 431
III. Mobile sources ... 432
    A. Automobile standards ... 432
        1. Potential counterproductivity ... 437
        2. Carbon dioxide standard ... 439
        3. Additional concerns ... 441
            (a) Applying the tailpipe standards ... 441
            (b) Prohibiting emissions averaging ... 442
            (c) Onboard refueling technology ... 442
            (d) Onboard diagnostic systems ... 442
            (e) Useful life definition for cars ... 443
            (f) Motor vehicle testing and certification ... 445
            (g) Use of state inspection information ... 445
    B. Fuels provisions ... 445
        1. Fuel volatility ... 445
        2. Lead phasedown ... 448
        3. Fuel quality ... 449
        4. Oxygenate mandate ... 449
        5. Outer continental shelf ... 450
IV. Acid deposition ... 450
    A. Scientific research and acid precipitation ... 451
        1. The paradox of NAPAP ... 452
            (a) Progress made under current Clean Air Act ... 452
            (b) Aquatic effects ... 454
            (c) Forests ... 457
            (d) Crops ... 457
            (e) Materials ... 457
            (f) Visibility ... 457
        2. The disregard for NAPAP ... 457
        3. The truth about health effects ... 458
            (a) The current Clean Air Act ... 459
            (b) The asthmatic response to SO_2 ... 459
            (c) The health effects of acid aerosols ... 461
            (d) Acid deposition and drinking water ... 466

(e) Nitrogen oxide 467
B. The committee proposal 468
1. The emissions cap 468
2. Compliance deadlines 469
3. NO_x reductions 470
4. Innovative technologies 470
5. Emissions trading 472
6. Plants under construction 473
C. The cost of the committee bill 473
V. Air toxics 476
A. The failure of section 112 476
B. The Committee's proposed solution 476
1. List of pollutants 477
(a) Compound categories 477
(b) Ammonia 477
2. Voluntary emissions reduction 478
3. Utility powerplant emissions 479
4. Additional regulation of carcinogens 480
5. Accidental release provisions 483
VI. Stratospheric ozone (CFC) and greenhouse provisions 484
A. HCFC and methyl chloroform 484
B. Carbon tetrachloride 486
C. Recycling 486
VII. Permits 487
VIII. Enforcement 488

EXECUTIVE SUMMARY

The Clean Air Act has and will continue to be an important tool by which to secure cleaner, healthier air throughout the United States. In our pursuit of ever more effective means to achieve that goal, we should heed the "tried and true" principles that have brought the United States success in improving its air quality in the past.

The most vital of these principles are:

(1) the preservation of a free society where entrepreneurial innovation can thrive,

(2) a firm adherence to the soundest science when establishing air quality standards, and

(3) substantial flexibility allowing local decisions on how best to achieve air quality goals.

It is difficult to see how these principles are reflected in the Clean Air Act Amendments of 1989, as reported by the Senate Environment and Public Works Committee. The bill's general framework, with extended goals for attaining ambient air quality standards, a technology-driven air toxics program, and a "somewhat" market-based approach to sulfur dioxide reductions, is sound enough to achieve substantial improvements in air quality. Unfortunately, the Committee has burdened that framework with a host of technological impossibilities, unscientific goals, and inflexible Federal mandates.

The Nonattainment Provisions rely heavily on the current uncertain and ill-defined regulatory schemes for "attainment." These schemes have shown themselves to be very superficial, often influenced more by weather and topography than by man-made pollution. A longer-term and better defined "Advance Planning Program" is needed to give America's cities a more certain future, with more identifiable clean air goals to achieve.

In addition, the bill imposes statutory mandates on what has, in the past, been local governmental decisions about HOV lanes, fees and charges on parking, no-drive days, vehicle restricted areas, single-driver bans, and gas station refueling systems. Add this to the expensive new emission and automobile registration fees, along with a greatly increased regulatory presence in the cosmetic and consumer products markets, and you have an unprecedented intrusion by Federal regulators in the every day lives of almost every American.

The Mobile Sources Provisions of the bill go far beyond what is either needed or possible. Both President Bush's and the Committee's bills impose California's tailpipe standards nationwide by the mid-1990's. The committee, however, goes further to require standards at double that stringency by the year 2003. The EPA projects that such provisions will raise the cost of the Committee mobile source regulations to $7.5 billion, as compared to $1 billion in the

President's bill. And yet, the Committee bill only achieves an additional 2 percent air quality improvement over the President's proposal.

The bill also imposes a "carbon dioxide" standard on cars—the only function of which is to make inconsequential deadwood out of all of the laws and regulations pertaining to corporate average fuel economy (CAFE). Since the standard imposed in the bill requires far more fuel efficiency than current and even proposed CAFE standards, the bill would relegate the CAFE to just so much excess baggage in the Statutes at Large.

One of the most troublesome effects of the *Acid Deposition Title* is the virtual death sentence it imposes on the future of coal as an energy source in the United States. The sulfur dioxide "emissions cap" imposed by the bill is not so much a cap on SO_2, as it is a cap on any further construction or expansion of coal-fired power. Such policy holds serious consequences for our national energy supply.

The costs of this title come down hard on Midwestern communities in the form of higher power rates. It seems incredible that we should impose such costs when the benefits of the Committee's "acid deposition control program" are so doubtful. No lives would be saved, no fields would be made greener, no soils more fertile, and very few lakes would be made less acidic.

The Air Toxics portion of the Committee bill is a virtual regulatory "house of cards," stacking up whole industries for banishment from the territorial boundaries of the United States, all because a rat study somewhere in the bowels of the Environmental Protection Agency may be "crunched" to reveal extremely hypothetical risks approaching 1-in-10,000 or 1-in-a-million. The EPA has identified dozens of industries who currently have no technologically feasible means of achieving such standards.

And finally, the enormous paperwork overhead and extremely punitive provisions of *the Enforcement and Permitting* titles will undoubtedly place much of the small business community in a regulatory straitjacket. As these provisions and their consequences become known, the public outcry will likely make the recent reaction to section 89 of the Internal Revenue Code (as added by Public Law 99-514) pale by comparison.

I. INTRODUCTION

The ability of Americans to breathe clean wholesome air, free from life-threatening pollutants, is intrinsic to the inalienable rights of life, liberty, and the pursuit of happiness which we declared to be ours at the inception of this nation. Certainly disabling illness, confining respiratory disease, and life-stealing cancer are as much or much the enemy of our liberty than any tyrant ruler could be.

So it is appropriate that Congress should seek a means of securing and protecting the integrity of the air we breathe. For over three and a half decades, the "means" chosen by Congress has been embodied in what we know as the Clean Air Act.

The Clean Air Act [1] consists today of Public Law 159, signed into law on July 14, 1955, and a series of amendments enacted by Congress in an effort to expand and improve its effectiveness as a tool to combat air pollution. As the Clean Air program has expanded, it has met with varied degrees of success. Certainly one of its original intentions, to bring about cleaner automobiles and transportation in general, has been mostly achieved. Today's automobiles are 25 times cleaner than they were just two decades ago.

Other once-serious airborne health threats are coming under control as well. Ambient levels of lead and oxides of nitrogen are well within acceptable health thresholds in most parts of the United States. Just since 1978, carbon monoxide and sulfur dioxide levels have been reduced by a third.[2] Even where health goals have not been achieved, the quality of the air in U.S. cities is much better than it is in most other major industrial cities around the globe. And this improved air quality can be seen in the health of Americans. Just look at what we have achieved since the turn of the century:

—Life expectancy is 29 years longer,

—Infant mortality (the incidence of a newborn dying before its first birthday) is down 90 percent, and

—The incidence of incurable disease (including cancer) has dropped from 90 percent to 45 percent.

As we look for ways to continue this improvement, it is helpful to look back and see what has worked in the past—what has been successful in bringing about cleaner air—and what has not. The exercise reveals some valuable lessons, including the following three guiding principles:

A. Allow Freedom To Work

First, the unleashing of the human mind in a free society, resulting in entrepreneurial innovation and continuing technological advances, is our best hope. The single greatest improvement in air quality in the United States came about as a result of one small invention, the electric motor. And innovations that improve air quality are happening all the time. Ford Motor Corporation recently developed a new catalyst that maximizes the control of auto emissions using a more cost-effective mix of platinum group metals. Arco Oil Company recently started sales of a new leaded gasoline, EC–1, designed to achieve lower emissions from the cars still on the road that create the most pollution.

The interesting point is that neither of these innovations came about at the command of government. Rather, they resulted from prudent corporate managers identifying ways to cut costs or attract new customers. History reveals that closed societies, where the government controls technology and innovation, have dismal success at achieving clean air goals. It is not surprising that East Germans have recently been fleeing to the cleaner air of West Germany, nor that their smoke-belching cars must be exempted from West German emission standards as they role through the iron curtain.

---

[1] 1 42 U.S.C. 7401–7626.

[2] Excerpt from "What to Expect from the New Clean Air Act," National Association of Manufacturers, November 1989, citing the U.S. Environmental Protection Agency, March 1989.

There are some who claim that economic growth and technology is what threatens our health and the environment. Nothing could be further from the truth. It was William J. McIlrath who recalled the time when—

> . . . There were about 8,000 cars in the United States, only 10 miles of concrete pavement, few spray cans to destroy the ozone layer . . . The air was relatively unpolluted . . . and our average life expectancy was 47 years.

Now, our life expectancy is up to 75 years, and physicians expect it to keep rising for the foreseeable future. Modern technology can be credited for *saving lives,* and fostering a society in which such technology thrives is the best way to assure improved air quality.

B. ADHERE TO SOUND SCIENCE

Second, if government standards and emission limitations must be set, clean air goals are best achieved when those standards are firmly founded in the soundest of science.

The police power of the Federal Government exists, as Thomas Jefferson said, "only to defend our true rights and freedoms, and to take none of them from us." Such power should be used in the name of "cleaning the air" only when the best science has confirmed that cleaner air will, as a matter of scientific fact, be the result. Regulations and restrictions that lack a basis in sound science impose on the freedom of the individual, consuming time and resources, with the possibility of yielding little or no health benefit to show for it. Such "squandering" of resources not only violates the principles of good government, but ultimately takes its toll in lost opportunities to apply those resources where they will truly achieve cleaner air.

One of the most well-respected provisons of the Clean Air Act is its procedure for developing ambient air quality standards. The development of "criteria documents," the exhaustive review of scientific studies, analyses and available literature is definitely time-consuming. But when attaining those standards could cost billions of dollars and force dramatic lifestyle changes on millions of Americans, any lesser priority on ensuring the absolute best science cannot be justified.

C. PERMIT LOCAL FLEXIBILITY

Third, and finally, the Clean Air Act has been successful to the degree that it has adhered to one of its original findings—"that the prevention and control of air pollution at its source is the primary responsibility of States and local governments." [3] The people who are closest to a source, whose lives as well as livelihoods are at stake, can best choose for themselves how they want to achieve their clean air goals. Leaving such flexibility to local and State governments allows them to develop the control strategies that are most likely to address the unique problems they face. It also allows them to craft the strategy in a way that the regulated community can appreciate and accept. The mechanisms of the Clean Air Act have always worked best when there is common ground and consensus between regulator and regulated. Conversely, the Act's most serious flaws occur where compliance is achieved only at the whips and chains of the Federal Government.[4]

---

[3] Section 101(a)(3) of the Clean Air Act.

The Clean Air Act Amendments of 1989 [5] represents the Senate Environment and Public Works Committee's latest attempt to improve upon the Clean Air Act. And there is no disputing that some improvements are necessary. While claiming that "100 million people are breathing air that is hazardous to their health," as does the Committee majority, is a gross misrepresentation, nevertheless, health-based standards have not been achieved in many of the Nation's major cities. To the degree that the above fundamental principles leading to better air quality can be employed to address this problem, some improvement on the current Clean Air Act is both possible and prudent.

Unfortunately, the Committee bill does not adhere to these principles, but instead relies heavily on the same command and control proposals that have been raised, albeit unsuccessfully, time and time again throughout the last decade.[6]

At almost every turn, the bill ignores low-cost but efficient control strategies, adopting instead extremely costly and technologically difficult provisions. The bill seems to accept the flawed philosophy that individuals will become creative and innovative if you hold a large-enough gun to their heads. If such "technology-forcing" were in fact possible, the communist bloc would be the world's greatest technological power today.

In many places, the bill abandons any adherence to sound science, advancing billion-dollar measures that might or might not improve the quality of the air we breathe. And it radically overhauls the way in which the federal clean air prgoram is administered through State and local governments, usurping many local decisions, and foisting upon local businesses a straitjacket of permits and enforcement.

The bill does deserve a few credits, however. More so than many previous clean air proposals reported by this Committee, the bill reported this year "reflects" a recognition that the marketplace can select opportunities for air pollution reductions much more efficiently than can any centralized regulatory power. Mandatory federal emissions warranties are rolled back in order to allow greater competition in the service and aftermarket parts industries. And the Acid Deposition title at least pays "lip service" to the concept of allowing the marketplace to determine where to most efficiently achieve acid precursor reductions.

---

[4] The sanctions for nonattainment beyond 1987, and the stiff health-based regulations under section 112 are cases in point. Provisions in these sections were so onerous, it became in the regulated party's interest to seek alternative relief—in the form of legislative or judicial intervention—rather than compliance.

[5] Hereinafter referenced as "the Committee bill."

[6] In three of the last four Congresses, the Environment and Public Works Committee has reported a major bill amending the Clean Air Act. In the 97th Congress, Senator Stafford of Vermont steered through the committee S. 3041. In the 98th Congress, he again led an initiative which was reported as bill S. 1292. Most recently, Senator Mitchell of Maine took the initiative in the 100th Congress to obtain passage of S. 1894. All of these bills were reported to the Calendar and received no further Senate consideration.

Because of this slightly new tone, the Committee bill may serve as an acceptable framework for further debate. If it is to be successful in achieving our clean air goals, however, there are many provisions currently contained in the bill that must receive greater scrutiny. The following discussion details several of those provisions in the hope that the fundamental principles of clean air progress can be "infused" into the bill during the course of future Senate deliberations.

II. ATTAINMENT OF AMBIENT STANDARDS

A. How To Measure Attainment

The Committee bill divides areas of the country that have not attained national ambient air quality standards (NAAQS) into four classes, each with different requirements and deadlines. These requirements become more stringent as the severity of the problem escalates. A system which designates four categories of nonattainment is by far a vast improvement over a system that recognizes nothing but attainment versus nonattainment. However, making these categorizations inflexible and imposing rigid Federal requirements within each category is arbitrary. The classification system needs to be more sensitive to local conditions.

1. DESIGN VALUE

The bill specifically adopts the use of present ozone monitoring data and the present EPA approach of using the "design value" extracted from that data to define nonattainment. The bill would actually increase the impact of these techniques by using them as the basis for classifying nonattainment areas for purposes of assigning them to one of the four categories of nonattainment.

There are severe problems with EPA's approach to monitoring and use of the design value—and those problems are compounded by the Committee bill. Every air quality area engages in monitoring, though there is no specified number of monitors. There can be as few as one,[7] or as many as 43.[8] EPA's general guidance is to place these monitors in areas where high ozone levels are likely to be found. Each locality collects hourly readings from the monitors. If, over a period of three years, four readings from any monitor are in exceedance of the standard, then the entire area is classified in "nonattainment." The fourth highest reading above the standard—the one that tips the area into nonattainment—is called the "design value," and is the figure toward which efforts to reach attainment are targeted. This design value is frequently cited with an implication that it represents some measure of *average* air quality for the entire air region. In fact, it is computed from the *highest* measurements from any monitor in an entire area.

The design value is not likely to be representative of overall air quality. It ignores other important considerations, such as the number of times per year the ozone standard is exceeded and how great the exceedances are. It places no weight on the duration of exceedances. It does not recognize that different conditions may prevail in different parts of a nonattainment area, and that monitors are usually sited to identify the worst levels, not the average.

---

[7] As in Portsmouth, New Hampshire.

[8] As in the Los Angeles, California area.

Given these problems, the reliance on the design value as the basis for significant and extremely costly Federal mandates is ill-advised. The whole design value approach needs reformed, and until this is accomplished, the number should be given greatly diminished importance.

2. UNDERSTANDING THE NATURE OF THE PROBLEM

Perhaps the best argument for adhering to an attainment strategy with the greatest local flexibility is the degree to which attainment is sometimes more a function of local weather and topography than a matter of controls on industry.

(a) Biogenic Hydrocarbons

A great inequity currently exists in the way the Clean Air Act pursues the goal of "attainment." While the current focus on mobile and industrial emissions has met with success in some cities, those same controls have achieved no success in others (such as Houston and Atlanta). One of the reasons for this is the mere fact that not all air pollution is man-made, and as long as Clean Air efforts focus only on anthropogenic pollution, the real problems will not be solved.

A report prepared by researchers at the Georgia Institute of Technology summarized the problem as follows:

> The effects of natural hydrocarbons must be considered in order to develop a reliable plan for reducing ozone in the urban atmosphere. Trees can emit significant quantities of hydrocarbons to metropolitan areas such as Atlanta, and model calculations indicate that these natural emissions can significantly affect urban ozone levels. By neglecting these compounds, previous investigators may have overestimated the effectiveness of ozone abatement strategies based on reducing anthropogenic hydrocarbons.[9]

(b) Aberrations in Weather

The current dependence on the "design value" also exacerbates the degree to which weather variations may completely distort perceptions of real air quality conditions. In a report released this year analyzing ozone trends in 71 major urban areas, Dr. Kay H. Jones notes:

> Last year was an abnormally hot one . . . As a consequence, the number of times that ozone levels in many areas exceeded the federal clean air standard increased dramatically over the historical trend.
>
> In contrast, 1989 was much more in line with "normal" and the number of calendar day exceedances of

---

[9] W. L. Chameides, R. W. Lindway, J. Richardson, and C. S. Kiang, "The Role of Biogenic Hydrocarbons in Urban Photochemical Smog: Atlanta as a Case Study", *Science*, Volume 241, September 16, 1988, pp. 1473–1475.

> the ozone standard in areas most affected by the drought decreased dramatically in a range from 64 to 94 percent.
>
> The general public has been led to believe that 150 million people are exposed to unsafe levels of ozone. This is just not the case. In fact, based on 1986 data, over 70 percent of the nation's people are living in areas that are monitored and show *no* ozone problem.[10]

Dr. Jones further notes that "The majority of U.S. cities where ozone levels exceed federal standards will likely come into attainment within five years *without additional controls.* In fact, the 22 cities added to EPA's list of nonattainment areas last year should probably not even be on the list." [11]

The following charts illustrate Dr. Jones' findings of the great disparity between ozone levels in 1988 and 1989. Chart 1 shows the ozone exceedance days for 10 major cities in both 1988 and 1989, and Chart 2 contrasts the probability of the exceedances of 1988 reoccuring with the likelihood of future years being closer to 1986 or 1989.

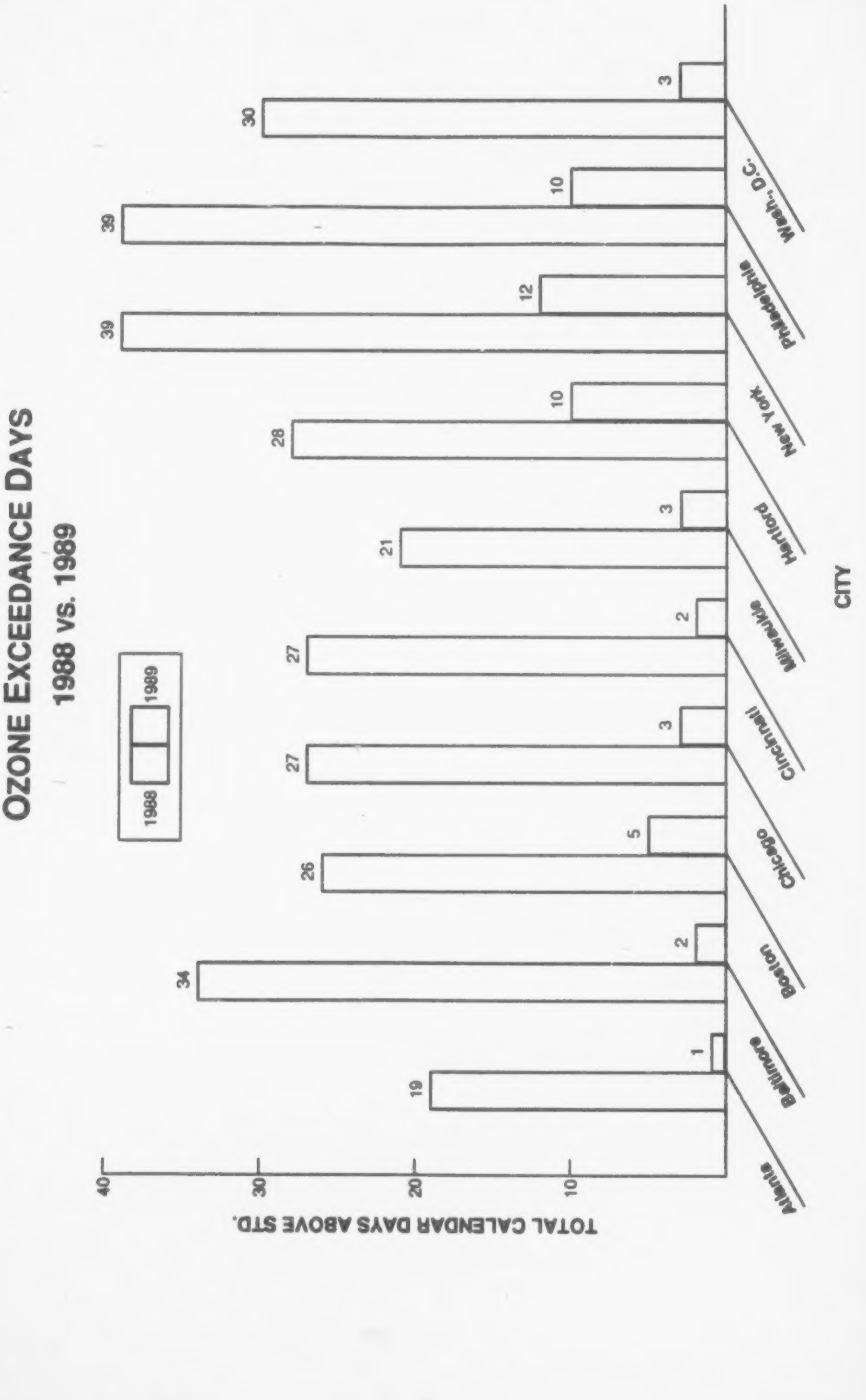
As this last chart reveals, 1988 constituted in essence a "50-year abnormality." To base significant and long-term air quality planning on such an abnormal situation lacks scientific integrity.

---

[10] Statement of Dr. Kay H. Jones to the National Press Club, on the release of his research report, "1988: Ozone Warning or Wild Card? A Report on Ozone Trends in 71 Urban Areas", October 25, 1989.

[11] *Id.*

Chart # 1


OZONE EXCEEDANCE DAYS
1988 VS. 1989
1988
1989
TOTAL CALENDAR DAYS ABOVE STD.
40
30
20
10
CITY
Atlanta
19
1
Baltimore
34
2
Boston
26
5
Chicago
27
3
Cincinnati
27
2
Milwaukee
21
3
Hartford
28
10
New York
39
12
Philadelphia
39
10
Wash., D.C.
30
3

THE PROBABILITY OF THE 1986, 1988, AND 1989 OZONE YEARS RECURRING

	Recurrance—Years*		
City	*1986*	*1988*	*1989*
Baltimore	2	35	6
Boston	2	18	5
Chicago	3	50	10
Cincinnati	2	50	4
Detroit	3	36	6
New York	5	15	2
Philadelphia	6	33	2
Salt Lake City	5	33	2
St. Louis	2	16	3
Houston	2	3	3

* Equals number of years before a similar year will occur again or it will occur no more than once again in this number of years.

Chart # 2

3. ADVANCE PLANNING PROGRAM

As our Nation embarks upon another round of costly control measures to achieve Clean Air goals, it is essential that the mistakes of the past not be ignored and repeated. Many within the regulated industry believe the best way to accomplish a "modernizing" of our view toward attainment goals is through an Advance Planning Program involving all levels of government.

This Advance Planning Program would develop better criteria for defining and assessing when an area is in "nonattainment," improve the accuracy of inventories which influence control strategies, create a monitoring system which defines the characteristics of the "problem," improve air quality modeling techniques and rank the cost-effectiveness of control options, identifying why some controls have worked and others have not.

The current drive to reach such ill-defined "attainment" goals may not be in the Nation's long-term interest. Many localities have imposed extensive and costly control requirements only to find that they must go back to the drawing board and seek to impose even more costly controls, the effectiveness of which is still not guaranteed. It is imperative that the nation take the time now to assess the problems, obtain better information and more thoroughly analyze possible solutions. An Advance Planning Program would provide a solid basis for accomplishing this, and it should be a part of Congress's current activity on the Clean Air Act.

B. New Federally-Imposed Requirements

As a condition of any area of nonattainment being assigned to a particular category, the Committee bill lays out a number of control options for areas to adopt. Apparently it is the view of the majority on the Committee that local planners do not understand the air pollution problems they face, and therefore, Congress must substitute its own judgment.

1. FEE STRUCTURE

Perhaps the most encompassing of the Committee bill's new impositions on ambient air pollutant sources are the many and varied fees to be assessed. Besides the "basic" $75/ton fee for carbon monoxide, ozone and ozone precursor, and particular matter sources, the Committee bill includes the following:

(a) $2.00 Auto Registration Fee

The bill also requires areas in carbon monoxide or ozone nonattainment to impose an annual $2.00 fee on top of current automobile registration fees. If a State or locality fails to do this, EPA is empowered to levy the fee itself.

Such a fee is completely unjustified. First, if a State or locality needs the revenue in order to operate their air quality programs, they do not need this provision in order to seek those revenues as part of automobile registrations. It is entirely possible that a State may want to impose fees on something other than auto registration (in an attempt to encourage voluntary participation in the registration program). The Committee provision excludes that kind of local discretion.

Furthermore, there is no equity in such a fee. Automobile emission controls are built into the cost of the automobile when the owner buys it. Highway maintenance and construction undertaken as part of transportation control measures are also paid for by the highway user in the form of the fuel use tax paid at the gas pump. Most State air program costs are due to stationary sources, not mobile sources. Consequently, this fee taxes car owners to cover the cost of completely unrelated air program administration.

And, should a State or locality refuse to assess the fee, the money accrues to the EPA in a special fund outside the normal appropriations process for the agency.

The Highway Users Federation has this to say about the tax:

> Such a fee would, in effect, constitute a tax on vehicle ownership, the revenues going to an ill-defined entity (or the EPA) for an ill-defined purpose. It would also lead to enormous administrative problems since motor vehicles are registered, licensed and taxed at State or county, but seldom metropolitan levels. Potential evasion of such localized fees might be fairly likely, and the cost of enforcement would offset much of the revenue generated.
>
> Highway users accept reasonable user fees when the revenues are used for highway improvements, but they resist being singled out to pay for general societal programs which should be funded by all taxpayers.[12]

(b) EPA Budget Add-on Fee

In an apparent effort to completely bypass the normal appropriations process of Congress, the Committee bill makes anyone already paying a fee under other sections of the bill tack on an amount "as the Administrator shall require", but at least $15/ton, to go directly to EPA. Then . . .

> . . . Notwithstanding the provisions [requiring deposit of Federal revenues in the Treasury pending appropriation], revenues from fees imposed under this subsection shall be deposited into a special fund of the Treasury and shall thereafter be available for appropriation only to carry out the activities of the Agency under this Act.[13]

Again, there is no equitable basis for such a fee. The Committee did not even entertain any hearings or solicit any cost estimates on it (it was inserted as a "leadership" amendment at subcommittee mark-up for the sole purpose of increasing EPA's available funds).

(c) $5,000 "Sanction" Fee

If an area does not come into "attainment" within the time specified for the "category" to which is has been assigned, one of the "sanctions" is to elevate the normal $75/ton emissions fee to $5,000/ton. The absurdity of such a provision is two-fold.

---

[12] Letter of Neil Gray, Director of Government Relations, Highway Users Federation, to the Hon. Steve Symms, U.S. Senator, November 13, 1989.

[13] From the Committee bill's proposed amendment to section 173 of the Clean Air Act.

(1) As discussed earlier, the condition of "attainment" is not well defined, and may be influenced by many factors completely out of the control of state regulators—and certainly beyond the control of an individual source. A plant or factory, even one that reduced its emissions far beyond that required by its permit or by the State's implementation plan, could be faced with the $5,000/ton fee merely on account of an abnormally hot or abnormally cold year.

(2) This fee is imposed on *all major sources,* which could easily include pulp mills, dry cleaners, or other companies in the business of painting, printing, plastic coating, solvents usage, electronics etc. Many *small* businesses often emit up to 100 tons per year.[14] That would mean fees imposed on a small business under this provision could easily total near a HALF MILLION dollars per year. Many small businesses in the U.S. don't even gross that much!

2. STAGE II VAPOR RECOVERY

The issue of whether or not to force gas stations to adopt bulky accordion-like vapor recovery systems dubbed "Stage II" is not new. The issue was the subject of substantial debate when the Committee considered S. 1894 in the 100th Congress.

EPA Administrator Lee Thomas, in testimony before the Committee, had clearly voiced concerns about the duplicative overcontrol imposed by the overlapping Stage II vapor recovery and onboard canister provisions in the bill. He said:

> The Administration is doubtful of the benefits of requiring Stage II technology on gasoline pumps in order to control basically *the same* refueling vapors captured by the onboard control required on new cars by title III. *Over the long term, this technological redundancy would lead to very high marginal costs and very little marginal control.*[15]

To illustrate his point, Administrator Thomas presented a graph prepared by EPA's office of mobile sources showing that, by mid 1996, onboard canisters could be controlling the same and more hydrocarbon emissions as the Stage II recovery systems mandated by this bill—assuming current enforcement.

Stage II enforcement is an even more difficult problem. for the awkward and cumbersome Stage II nozzle to work properly, it must be held so as to form a seal around the gas tank opening on the car. This is difficult for many people to do, and, in fact, many people don't. Stage II efficiency, as measured in the real world, is extremely low. New York State, as a matter of fact, has not, with existing monitors, measured any ozone level reductions attributable to Stage II.[16]

---

[14] "Clean Air Legislation: What Cost to Small Businesses," National Association of Manufacturers, October 1989, p. 2.

[15] Testimony of Lee M. Thomas, Administrator, Environmental Protection Agency, before the Subcommittee on Environmental Protection, Senate Committee on Environment and Public Works, July 22, 1987, p. 19 (emphasis supplied).

[16] Herman Bach, Northwestern Ohio Gasoline Dealers Association, September 22, 1987, letter to members of the Senate Environment and Public Works Committee.

Even in the face of clear evidence that the Stage II requirement is inefficient and duplicative, some argue that this duplication is necessary so as to control refueling emissions sooner. Considerable evidence, however, discredits even that argument.

According to the New York State Department of Environmental Conservation, "the estimate for fully implementing a Stage II program, in just the ozone nonattainment areas, is five to six years." [17] If that is true, then the Stage II program imposed by this bill could not be fully implemented until *after* onboard canister controls are mandated on all new cars in 1993.

And finally, there are the costs of this provision to consider. The Congressional Research Service estimates this provision could cost America's gas stations more than half-a-billion dollars.[18] According to EPA, the capital investment required for Stage II is at least $12,000 per gas station, and the petroleum marketers and service station dealers estimate it to be much more. After that, an additional $2,500 per year is required for maintenance.[19] The Service Station Dealers of America, Inc. have estimated that these costs could force many service stations out of business, as many as 9 percent due to inability to finance the initial capital costs, and as many as 20 percent due to the annual maintenance costs.[20]

3. TRANSPORTATION CONTROL MEASURES

The bill requires States with serious and severe ozone and serious carbon monoxide nonattainment to revise their State implementation plans to include "transportation control measures" designed to dramatically curtail automobile use. These measures would not only demand radical changes in the lifestyles and restrictions on the personal mobility of ordinary Americans, but also impose further crushing burdens on large and small businesses. For example, the bill could require States to adopt measures like the following (or alternative measures that lower emissions by a comparable amount):

—"Trip reduction ordinances," which likely could mean gas taxes, gas rationing, alternative driving days, or forced reductions in miles travelled per car or per person;

—"Vehicle restricted zones," which could cripple business activity in downtowns and other commercial areas; and

—"Programs for improved public transit," which could mean multibillion dollar mass transit systems.

A number of national interest groups representing the mainstream Americans likely to be severely impacted by these measures voiced their concerns to the Committee. Among them were the American Automobile Association (AAA) representing the average driver, and the National Association of Home Builders, representing those who are faced with the dilemma of putting homes in places where people will be able to commute back and forth to work.

---

[17] Harry H. Hovey, Jr., P.E., Director, Division of Air, New York State Department of Eenvironmental Conservation, November 5, 1984, in comments submitted to the Environmental Protection Agency on "Regulatory Strategies for the Gasoline Marketing System", Docket #A-94-07.

[18] Congressional Research Service, *Discussion of a Draft Bill to Amend the Clean Air Act,* (CRS—Library of Congress—87-762 ENR, September 15, 1987), p.2.

[19] Testimony of Lee M. Thomas, Administrator, Environmental Protection Agency, before the Subcommittee on Health and the Environment, House Committee on Energy and Commerce, April 27, 1987.

[20] Herman Bach, letter to Committee members.

Perhaps most indicative of the concerns voiced were those of the National Retail Merchants Association. In a letter to members of committee, Tracy Mullin explained NRMA's position as follows:

> The bill includes provisions that would limit downtown access by imposing fees and charges on roads and parking, impose no-drive days and vehicle restricted areas and ban single driver cars. In NRMA's view these measures are extremely inflexible, could well exacerbate downtown decay and may prove counterproductive by adding to traffic congestion in toll plazas or on roads that have not been restricted.
>
> . . . In our view, each governor ought to be encouraged to find creative solutions to transportation concerns that best meet the need of each state.[21]

4. OFFSET REQUIREMENTS

The Committee bill requires those sources seeking new "permitted" emission authority to offset such emissions with reductions in some other emissions source one and a half times greater (in serious nonattainment areas) and twice as much (in severe and extreme areas).

That the Committee doesn't recognize how counterproductive such offset requirements are to true air quality improvement is astonishing. The Chairwoman of California's Air Resources Board, an entity known for its willingness to adopt far-reaching measures to obtain even small increments in improved air quality, expressed her concerns with such offsets as follows:

> As with the existing Act, the bill requires that new or modified major sources obtain reductions in emissions from existing sources to "offset" the new emissions they create prior to receiving permits. However, based on the assumption that offsets are generally available, S. 1630 seeks to obtain a net air quality benefit from the new sources by requiring as much as a 2.0 to 1 offset ratio whereby the new sources must reduce twice the emissions it produces.
>
> Unless alternatives to the high offset ratios are provided, new sources otherwise desired by local communities and fully willing to meet stringent emission requirements, will find it very difficult to locate in the state. In addition some existing sources, particularly those with the lowest emissions, will find it difficult to expand or modernize their facilities in order to remain competitive in the marketplace.[22]

---

[21] Tracy Mullin, Senior Vice President for Governmental Affairs, National Retail Merchants Association, in a letter to the Hon. Steve Symms, U.S. Senator, November 14, 1989.

[22] Jananne Sharpless, Chairwoman, California Air Resources Board, in a letter to the Hon. Pete Wilson, U.S. Senator, November 14, 1989, pp. 2–3.

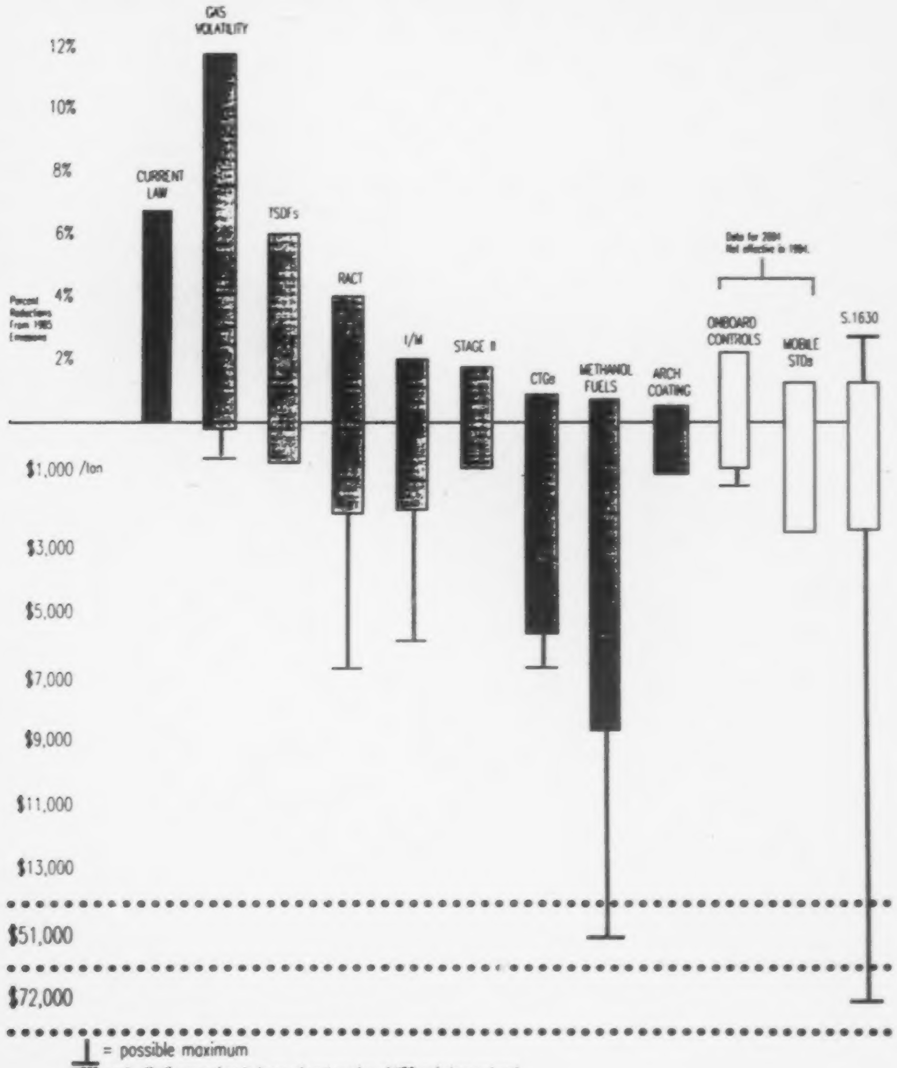
III. MOBILE SOURCES

A. AUTOMOBILE STANDARDS

There are few better examples of how the Committee bill overreaches than the automotive standards its imposes. According to the Environmental Protection Agency, the Committee bill would improve air quality by about 2 percent more than the President's proposal, but would cost $7.5 billion in comparison to the President's $1 billion. Chart 3 compares the cost-effectiveness of various hydrocarbon control measures with those in the Committee bill (S. 1630). Note that the Committee bill's provisions could be as much as 10 times more costly per ton of pollution controlled than the majority of other measures.

Before examining what kind of extravagant regulation might result in so little benefit for so great a cost, it is important to note that mobile source emissions will continue to decrease as new, cleaner vehicles replace older, less controlled cars and trucks (see Chart 4). Less than 35 percent of the motor vehicles on the road today were built to the latest standards, which already control tailpipe emissions *up to 96 percent* (see Chart 5). In fact, approximately 85 percent of automobile emissions are from pre-1983 vehicles (see Chart 6).

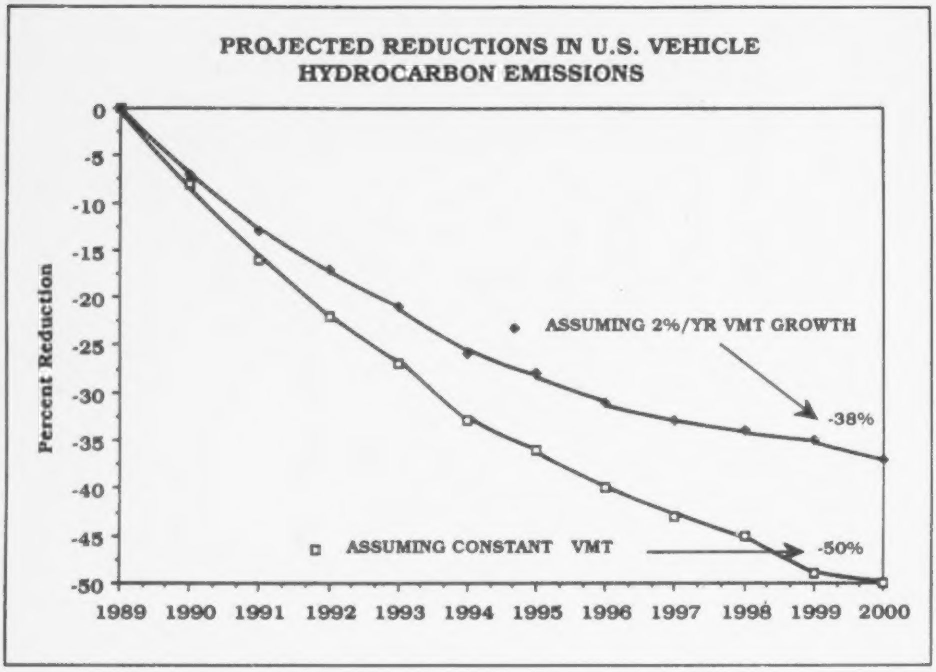
VOC Emissions Reductions in 1994 compared to 1985 Emissions And Associated Cost-Effectiveness, by Control Method



NOTE: cost-effectiveness given in terms of cost per ton of VOC emissions reduced.
SOURCE: based on data from OTA ("Catching Our Breath," July 1989) and from EPA.

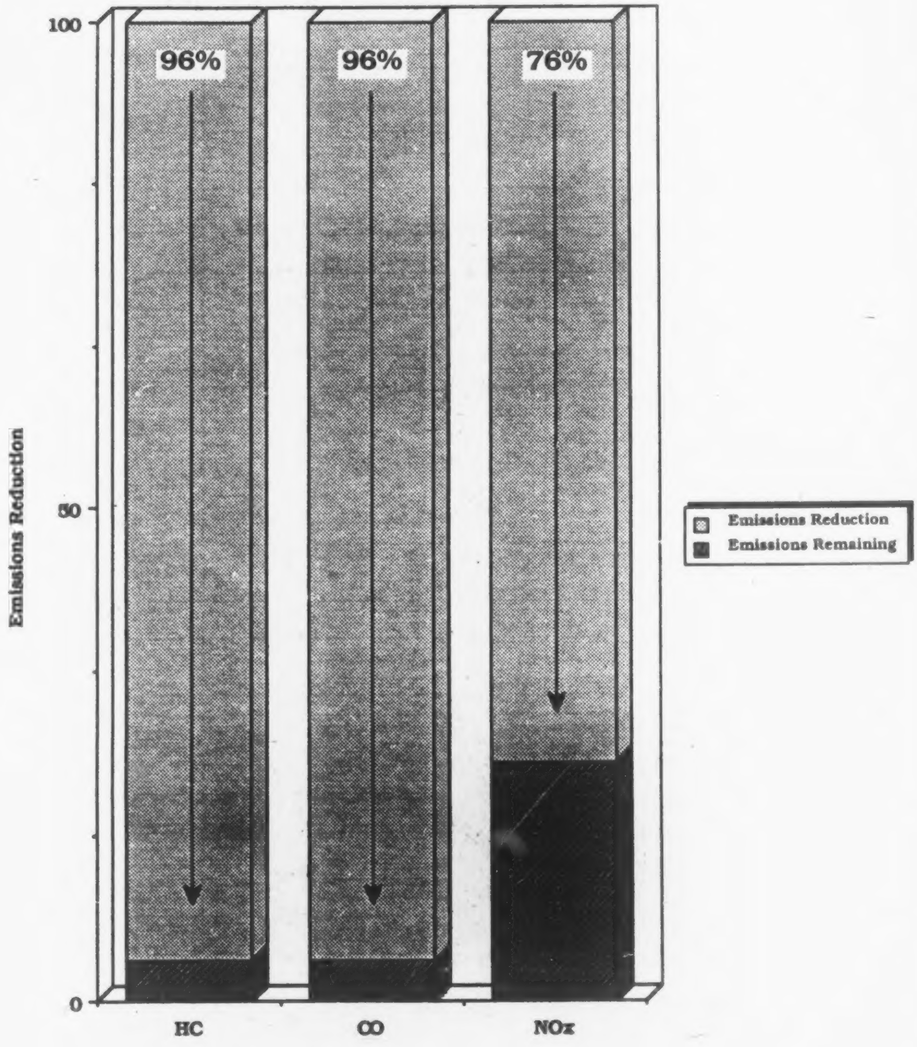
Chart # 3

Chart # 4


PROJECTED REDUCTIONS IN U.S. VEHICLE HYDROCARBON EMISSIONS
Percent Reduction
0
-5
-10
-15
-20
-25
-30
-35
-40
-45
-50
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
◆ ASSUMING 2%/YR VMT GROWTH
-38%
□ ASSUMING CONSTANT VMT
-50%

EMISSIONS HAVE BEEN REDUCED SUBSTANTIALLY

Gasoline Passenger Cars

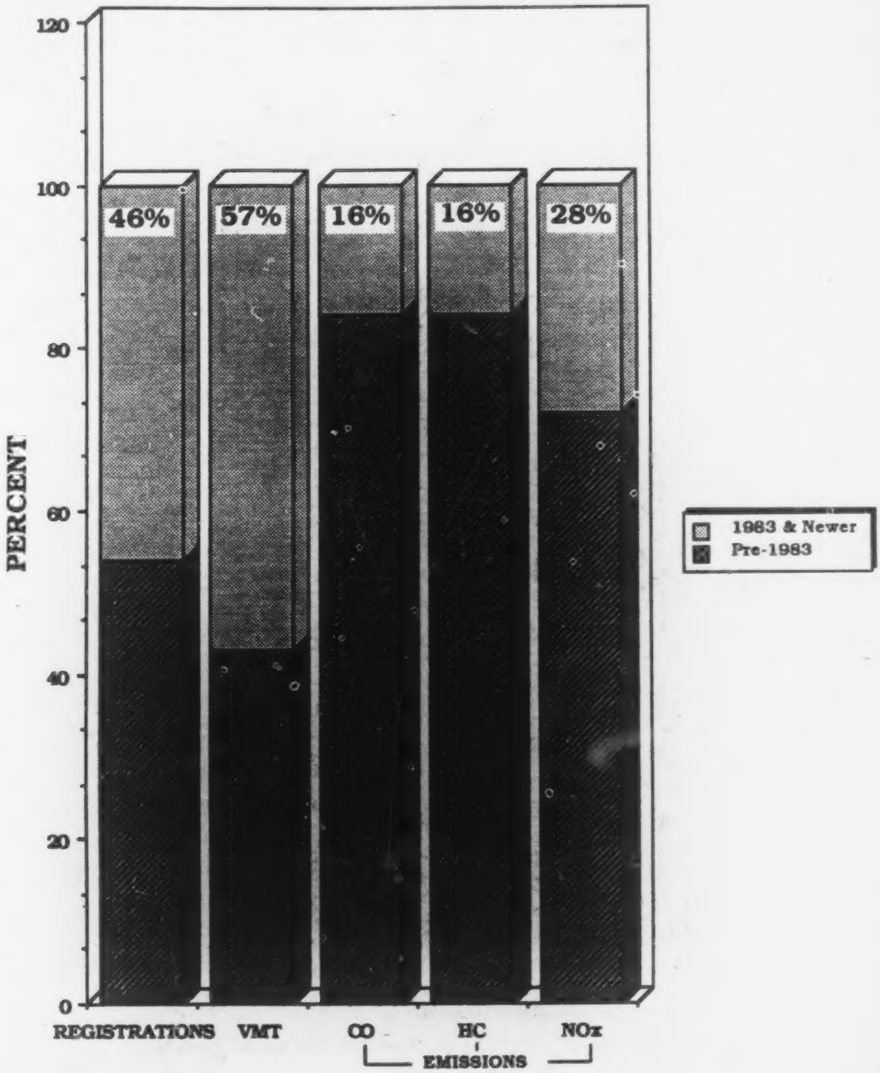


(Current Exhaust Emission Control Reductions from Precontrol Levels)

Chart # 5

Chart # 6

NEW CARS CONTRIBUTE LESS EMISSIONS



Sources: Registrations as of July 1, 1988 from R.L. Polk, EPA MOBILE4 mileage accumulation rates, and EPA MOBILE4 exhaust emission factors.

As is, the Committee bill will have a tremendous impact on motor vehicles and the consumers who buy them. Vehicle manufacturers have made it clear that the proposed tailpipe standards of the Committee bill, taken together with carbon dioxide emission controls, refueling controls, requiring light trucks and vans to meet passenger car standards, the 100,000 mile extended useful life definition, more stringent testing, certification, and recall requirements, would have the effect of eventually eliminating some vehicle classifications because there is no known technology with which to meet all of these provisions.

In addition, the potential cutbacks in model offerings would result in job losses. The National Association for the Advancement of Colored People was among the first to recognize that these job losses would impact blue-collar minorities first. In a letter to members of the Committee, NAACP Executive Director Benjamin Hooks said:

> We understand that it is proposed to adopt mobile emission standards that are more stringent than those contained in the Administration's clean air proposal. The tough clean-air bills that are before the Congress need not be made any tougher. . . . The NAACP is concerned that the adoption of more stringent mobile emission standards would have serious implication for the auto industry, auto dealers and consumers. Customer acceptance and satisfaction could be jeopardized by unreasonable standards which, in turn, could have a severe impact on the market and cause job losses. In recent years, the industry has lost thousands of jobs; many of these job losses were borne by minorities.[23]

And since more stringent requirements could also have an adverse impact on fuel economy and driveability of models that might remain, automotive fleet-dependent industries would suffer as well. Outcomes such as these are not acceptable.

1. POTENTIAL COUNTERPRODUCTIVITY

It is bad enough that the mobile source provisions in the Committee bill are both burdensome and unnecessary. What is even more troubling is that several of the bill's measures will actually *impede* local efforts to attain the ozone and CO standards and *worsen* air quality.

For example, among the bill's requirements are substantial further reductions in the NO_x standards for vehicles nationwide, irrespective of unique or localized air quality problems. It is now broadly accepted in the scientific community that reducing NO_x emissions in some settings may work at cross purposes with the goal of reducing ambient ozone levels.

Specifically, increased regulation of NO_x emissions may actually increase ozone concentrations in some areas, a phenomenon scientists call the "NO_x inhibition effect." In the complex chemical process leading to the formation of ozone, NO_x can both promote and inhibit ozone formation, depending on the atmospheric HC/NO_x ratio. Based on research by EPA and others on this subject, it can be shown that more stringent NO_x control could *negate* the ozone improvements otherwise resulting from HC control *in most major U.S. cities.*

---

[23] Benjamin L. Hooks, Executive Director, National Association for the Advancement of Colored People, in a letter to the Hon. Steve Symms, U.S. Senator, November 16, 1989.

In other words, the Committee bill could actually erect substantial obstacles to ozone attainment precisely in those few remaining areas of the Nation where significant further measures are needed. Speaking of similar NO_x standards in the Clean Air amendments reported by the Committee in 1987, EPA Administrator Thomas expressed "concern [that] some of the NO_x provisions of this bill could *actually exacerbate the ozone problem.*" [24] Since only a few counties in the Nation (in the Los Angeles area) currently do not attain the nitrogen dioxide (NO_2) air quality standard, trading further NO_x reductions for increased ozone levels would be both wasteful and counterproductive.

Likewise, the sharp mobile source emission reductions sought in the Committee bill may well take us backward rather than forward, especially in the short run. It stands to reason that impractical new controls that delay or interrupt the availability of new vehicles, or impair their driveability or fuel economy, will lead some consumers to defer new vehicle purchases and keep their existing vehicles longer. If enough potential new car buyers follow this course, the result will be *deteriorating* air quality because older vehicles are less well controlled than the new ones that otherwise would have replaced them.

This prospect is more than just theoretical. A Brookings Institution study of the last round of vehicle emission standards has confirmed that "even a small change in the scrapping rate [i.e., vehicle turnover] can exert a significant effect on short-run emissions outcomes," so that "any regulation that results in higher new car prices will raise aggregate emissions." [25] In fact, the Brookings study concluded that costly new car HC controls may lead to *increased* emissions for as long as *five years* after the standards take effect.[26] Thus, the bill's mobile source provisions *may actually make attainment more difficult in the near-term*, during the period when a substantial number of areas now only marginally "nonattainment" would otherwise be coming into attainment solely because fleet turnover would ensure broader penetration of the state-of-the-art controls already required under the Act.

The Brookings analysis also concludes that even over the longer run, "it is obvious that costs must greatly exceed benefits since the incremental costs of [vehicle emissions] control rise rapidly in the vicinity of *current* standards." [27] One important reason for this is that "*the relationships between [motor vehicle] emissions and air quality measures is tenous at best.*" [28] As the Brookings study observed:

---

[24] Testimony of Lee M. Thomas, Administrator, Environmental Protection Agency, Before the Subcommittee on Environmental Protection, Senate Committee on Environment and Public Works, July 22, 1987, p. 34 (emphasis supplied). [hereinafter "Thomas testimony"]

[25] Brookings Institution, *Regulating the Automobile* (1986), p. 97.

[26] *Id.*

[27] *Id.* (emphasis supplied).

[28] *Id.* at 98 (emphasis supplied).

> Surprisingly and even shockingly, Congress has legislated emissions controls on mobile, industrial, and utility sources without insisting upon careful measurement of the effects of these programs. Expenditures on air pollution controls have exceeded $20 [now $31] billion a year in recent years, but there appears to be little interest in spending even as much as 1 percent of that amount to measure the effect of these expenditures upon air quality.
>
> * * * * *
>
> Finally, it is unlikely that even the full implementation of the monitoring network planned by the EPA will be sufficient to capture the effects of mobile-source controls across the many air sheds with air pollution problems. Congress must show some interest in gauging the effects of automobile emissions controls before the EPA will develop a monitoring system and an analytical framework that is capable of measuring the impact of exhaust controls upon local air quality.[29]

The Brookings study estimates that "the annual costs of the *current* automobile emissions program are certainly greater than $10 billion a year." [30] Given the ineffective and, in many respects, counterproductive character of tighter controls and what Brookings calls the "rapidly" rising marginal costs of obtaining incremental emission reductions, it is evident that the mobile source controls in the Committee bill are seriously flawed.

2. CARBON DIOXIDE STANDARD

A carbon dioxide tailpipe standard in the Committee bill is a clear abuse of the federal motor vehicles emissions standards program, and an unprecedented and not-too-covert attempt to usurp an issue within the jurisdiction of the Senate Commerce Committee.

Carbon dioxide is not an air pollutant—it possesses no physical, chemical, biological, or radioactive property that presents, in and of itself, a threat to public health or welfare.[31] To regulate such a substance through an emission standard under title II of the Clean Air Act flies in the face of the clear and express purpose of the Act, "to prevent and control *air pollution.*" [32]

The proponents of the Committee's CO_2 standard may argue that CO_2 is an air pollutant by reason of its function as a greenhouse gas. Such an argument is transparent, however. First, to make it, one must begin by assuming the existence of a nexus between anthropogenic sources of greenhouse gas and global mean temperature increases, and the fact that such increases are of a degree that can adversely affect public health and welfare. But then, even making such assumptions, the Committee bill addresses such a small fraction of the total worldwide CO_2 emitted (U.S. vehicle emissions as shown on Chart 7) that it is very unlikely the standard would have any measurable effect on global climate changes.

---

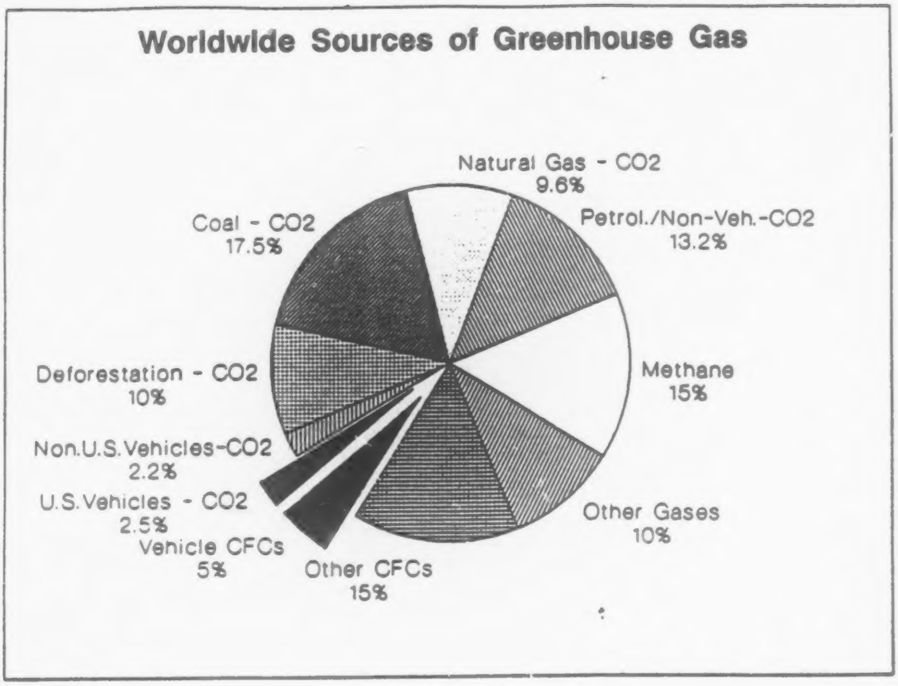
[29] *Id.* at 99.

[30] *Id.* at 114.

[31] See the definition of "air pollutant" under section 302(g) of the Clean Air Act.

[32] Section 101(a)(4) of the Clean Air Act.

Chart # 7


Worldwide Sources of Greenhouse Gas
Natural Gas - CO2 9.6%
Petrol./Non-Veh.-CO2 13.2%
Methane 15%
Other Gases 10%
Other CFCs 15%
Vehicle CFCs 5%
U.S.Vehicles - CO2 2.5%
Non.U.S.Vehicles-CO2 2.2%
Deforestation - CO2 10%
Coal - CO2 17.5%

The only functional purpose of the Committee's CO_2 standard is to make mute all laws and regulations dealing with corporate average fuel economy (CAFE). CO_2 is the natural product of combustion. The only way to generate less of it per-mile-traveled is to increase fuel economy. Consequently, if the CO_2 standard reflects a level of fuel economy greater than that of the CAFE standard, the CAFE standard becomes mute—a "deadwood" artifact of law with no consequence. Since the CO_2 standard reported in the committee bill would require fuel economy of no less than 45 miles per gallon, it would have the effect of completely supplanting the current CAFE standard.

As a matter of public policy, the degree to which the federal government should force the manufacturers of automobiles to attain greater fuel efficiency is much more than merely an environmental question. It involves matters of engineering design, safety, national energy policy, international competitiveness and trade. The Commerce Committee of the Senate is far better equipped to address these concerns than is the Environment and Public Works Committee, and is appropriately given jurisdiction over legislation amending the CAFE. The CO_2 standard in the Committee bill is an inappropriate usurpation of the Commerce Committee jurisdiction over this matter.

Ironically, as a matter of environmental policy, the Committee bill's CO_2 standard is clearly detrimental to clean air goals. According to the testimony of auto manufacturers, the fuel economy required by the standard would necessarily require them to scale down the size of their vehicle lines. With certain larger vehicle classes no longer available, but with public demand for such vehicles still high, there would be a significant incentive to keep the older, larger, and more polluting vehicles on the road longer. As the Brookings Institution study mentioned earlier pointed out, this decline in the scraping rate for older vehicles would perpetuate the air quality problems currently facing several major U.S. cities.

3. ADDITIONAL CONCERNS

The number of technical difficulties, procedural problems, and bureaucratic burdens imposed by the Committee bill on the automobile industry seems endless. Here is just a sampling:

(a) Apply the Tailpipe Standards

- —The first phase of the standards would go into effect in model year 1993, which would not allow sufficient time to make the necessary control system design changes.[33]
- —The standards proposed for the year 2003 have no basis in technical feasibility and are derived by merely calculating a doubling of the stringency of the proposed 1993 (California) standards.[34]

---

[33] Testimony of Samuel A. Leonard, Director of Automotive Emission Control for General Motors Corporation, Before the Subcommittee on Environmental Protection, Senate Committee on Environment and Public Works, September 28, 1989, p. 10 [hereinafter "GM testimony"].

[34] Testimony of Donald R. Buist, Director, Automotive Emissions and Fuel Economy Office, Ford Motor Company, Before the Subcommittee on Environmental Protection, Senate Committee on Environment and Public Works, September 28, 1989, p. 5 [hereinafter "Ford testimony"].

—The bill does not provide for phase-in of the proposed standards. Yet phase-ins are widely recognized as a meaningful cost-effective way to introduce new technology into a manufacturer's varied product line. They allow for proper planning and give manufacturers in-use experience on several models which whey can then apply to all models in subsequent model years.[35]

—No provision is made for seaprate certification and in-use standards. Emission reductions achieved in certification may not realistically be met in-use because of factors, many of which ar beyond the manufacturer's control, such as improper maintenacne, poor fuel quality, and improper vehicle use.[36]

—The bill requires smaller light-duty trucks to meet the same standards as cars, ignoring the important functional differences in cars and trucks.[37]

—The standards proposed for lager light trucks, together with the urrent federal useful life requirement of 120,000 miles, actually makes those standards more stringent than those in California.[38]

(b) Prohibiting Emissions Averaging

—Requiring "each and every vehicle or engine sold" to meet each emission standard is unreasonable, not recognizing the normal production and testing variability which cannot be eliminated. taken literally, it would appear to require testing of every vehicle produced, which would be enormously expensive and time-consuming. The prohibition is also unnecessary, since individual vehicle emission levels are inconsequential when compared to the impact of fleet emissions on air quality. No significant air quality benefit would result from adoption of such a prohibition.[39]

(c) Onboard Refueling Technology

—Controls on vehicles to capture emissions during refueling (onboard systems) could increase vehicle safety risks, as has been noted by the National Highway Traffic Safety Administration (NHTSA)[40], the National Transportation Safety Board (NTSB) and other organizations, both public and private, concerned with vehicle safety.

(d) Onboard Diagnostic Systems

—Such systems would monitor emissions control equipment and may one day elimiante the need for more costly and less efficient State emissions inspection and maintenance programs and recall programs. However, the provision in the bill too finely specifies the content and operation of the system. This may lead to many false failure indications causing consumer inconvenience in taking vehicles in four unnecessary repairs, and eroding confidence in the system, thus defeating its purpose.[41]

---

[35] Ford testimony at p. 3, GM testimony at p. 10.

[36] GM testimony at p. 9.

[37] Ford testimony at p. 2, GM testimony at p. 23.

[38] Ford testimony at pp. 4–5.

[39] GM testimony at p. 27.

[40] Letter from George L. Parker, Associate administrator for Enforcement, National Highway Traffic Safety Administration, U.S. Department of Transportation, to Taylor Bowlden, Legislative Director to the Hon. Steve Symms, U.S. Senator, November 28, 1989.

(e) Useful Life Definition for Cars

—The proposed doubling of today's 5 year/50,000 mile useful life nearly doubles the stringency of the emission standards. In order to be certain of compliance with the emission standards at 100,000 miles, a manufacturer would have to certify at significantly lower levels of emission to take into account normal deterioration of emission control equipment and production variability (see Chart 8). Taken in combination with the other standards in the bill, this provision could be impossible.[42]

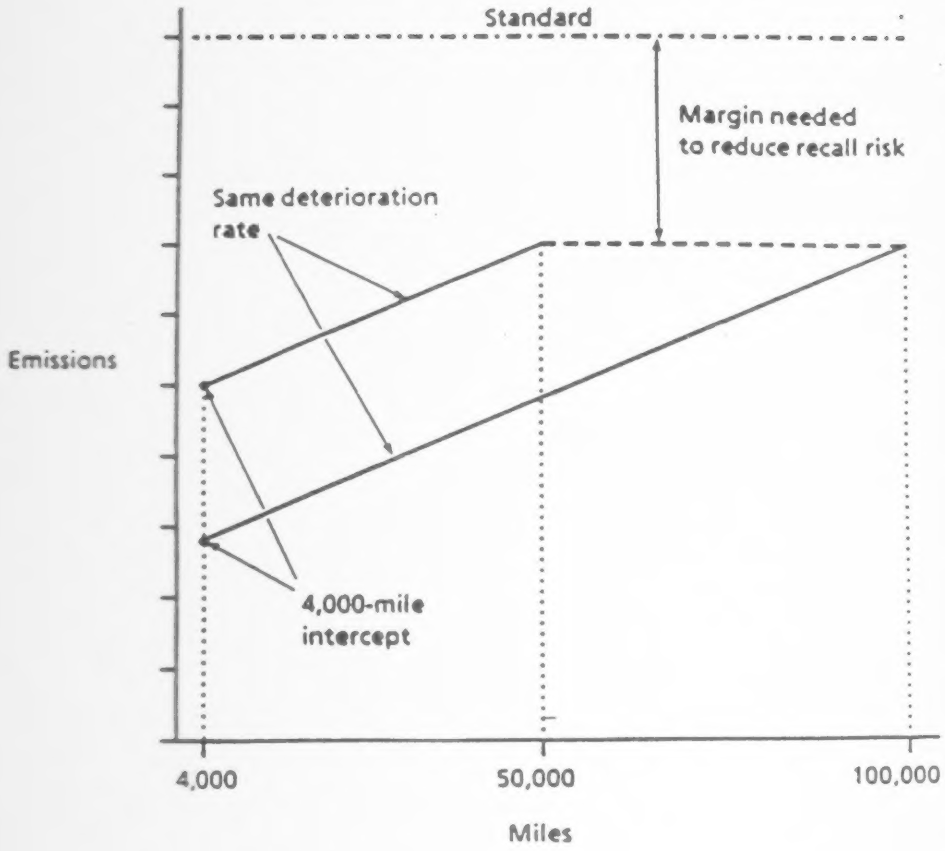
---

[41] GM testimony at p. 25.

[42] GM testimony at p. 24.

Chart # 8

Effect of Longer Useful Life



(f) Motor Vehicle Testing and Certification

- —Vehicles coming off the assembly line are randomly tested by EPA in a process called Selective Enforcement Audit (SEA). This audit is to assure that the vehicles meet the standards. The Committee bill requires a 90 percent pass rate in SEA. This provision, too, fails to take account of production variables that cannot be eliminated. This provision effectively tightens standards in the bill another 30 percent more.[43]

(g) Use of State Inspection Information

- —Because of difference in testing equipment, procedures, and conditions in the various states' inspection and maintenance programs, the data collected in some of these programs does not necessarily correlate with the elaborate federal test procedure used to certify vehicles. Use of this "inappropriate" data would only compound the many uncertainties that exist in EPA's current "in-use" data collection.[44]
- —Allowing such state inspection and maintenance program data to trigger recall testing that would be paid for by manufacturers, as the bill would do, would effectively punish manufacturers for weaknesses in state programs over which they have no control.[45]

B. Fuels Provisions

1. FUEL VOLATILITY

The Committee bill amends the Clean Air Act to require that the Reid Vapor Pressure (RVP) of gasoline sold during the high ozone season (May 16 to September 15) not exceed 9.0 psi in class C ASTM areas. This would effectively require RVP limits of 7.5 to 8.0 psi in ASTM class A and B areas, respectively. Gasoline with such a low RVP has not been sold in some class A and B areas in the past 20 years.[46]

Reid Vapor Pressure is a measurement of how volatile (or how "evaporative") a fuel is at sea level at 100 degrees Fahrenheit. It marks one point on what is known as a fuel's "distillation curve." Chart 9 shows a distillation curve and the significance of various points. Note that in order to easily start an engine in cold temperatures, at least 10 percent of the fuel should evaporate between temperatures of 122° F. and 158° F. The effect of lowering RVP is to raise the distillation curve so that less than 10 percent of the fuel evaporates within that temperature range.

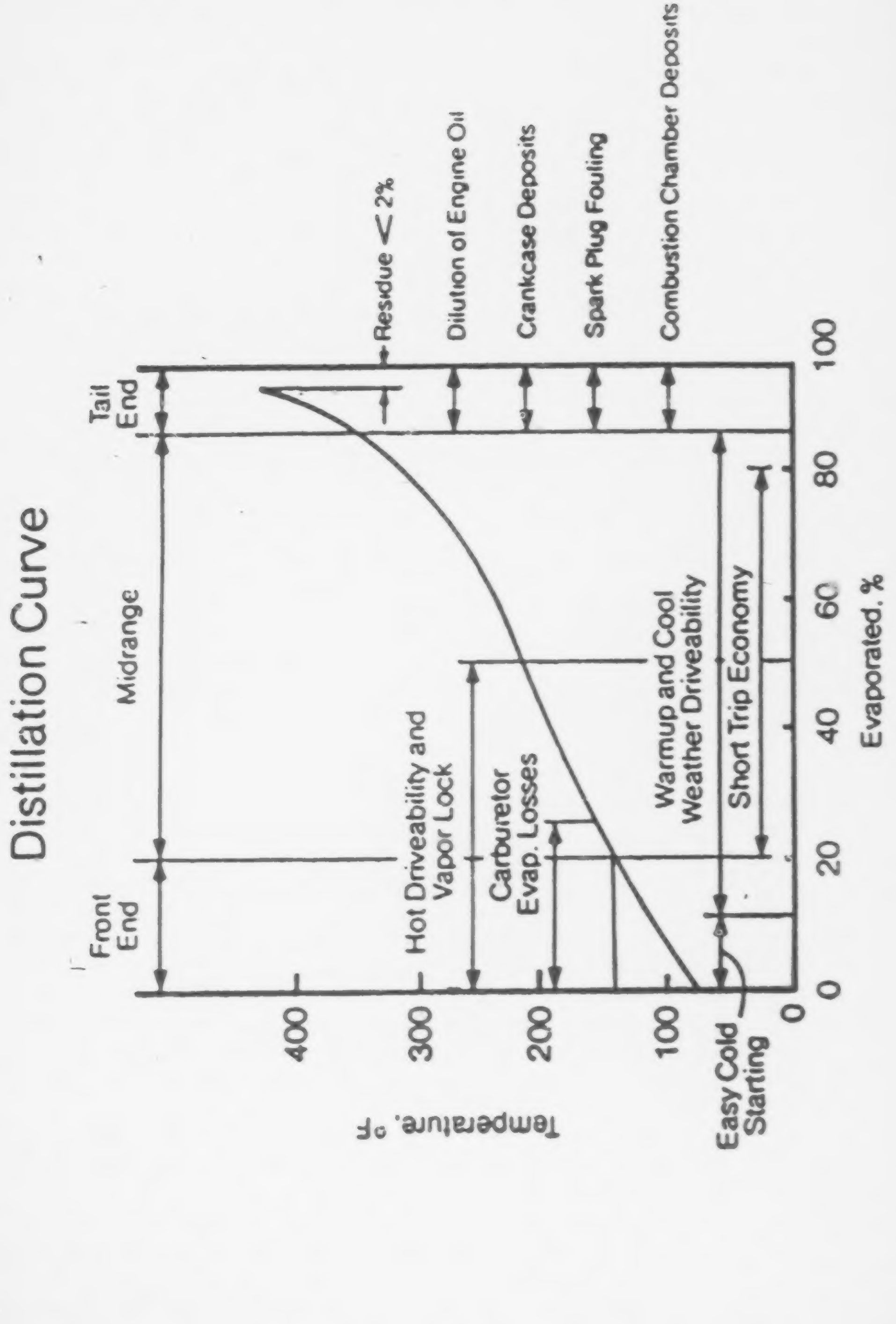
Certain class A and B areas of the northwest and Rocky Mountain regions already experience very low temperatures in the May 16 to September 15 time period. EPA currently regulates fuels sold during that time period to achieve RVP's between 9.5 psi and 10.5

---

[43] GM testimony at p. 27.
[44] GM testimony at p. 26.
[45] *Id.*
[46] ASTM *Annual Book*, 1969 and 1976.

psi. Even at those levels, cold weather episodes have produced start-up problems for certain vehicles. It is very likely that a lowering of RVP below 9.0 psi for such areas would create significant and wide-spread cold weather start-up difficulties.

Chart # 9


Distillation Curve
Front End
Midrange
Tail End
Hot Driveability and Vapor Lock
Carburetor Evap. Losses
Warmup and Cool Weather Driveability
Short Trip Economy
Easy Cold Starting
Residue < 2%
Dilution of Engine Oil
Crankcase Deposits
Spark Plug Fouling
Combustion Chamber Deposits
Temperature, °F
400
300
200
100
0
0
20
40
60
80
100
Evaporated, %

Part of the problem is that the actual RVP of fuel is always lower than the level at which EPA regulates it. This is because of EPA's "no tolerance" enforcement guidelines. Since gasoline RVP testing has a confidence level of 95 percent, and since EPA allows no tolerance above the established standard, refiners must produce fuel with volatility lower than EPA's standards to protect against test inaccuracies.

Ironically, the very areas where problematic RVP reductions might occur are located in states *already* in compliance with ozone standards. Consequently, the RVP reduction would be of little or no benefit to attainment of ambient air quality standards in those states.

This decreased responsiveness of the fuel stream with no accompanying air quality improvement would be costly as well. Decreasing RVP increases gasoline production costs since refiners must "back-out" lower cost components. It also requires refiners to operate reformers at higher severity rates to compensate for octane loss. When reformers are run at high rates, volume is lost. The net result is a significant increase in the cost of gasoline to the customer. In those areas of the country where RVP reductions are unneeded and possibly pose start-up problems, it does not make sense for Congress to require consumers to pay more for a less desirable product. The bill should be amended to make 9.0 psi the RVP standard during the high ozone season for all areas of the country.

2. LEAD PHASEDOWN

The bill makes effective January 1, 1991, a complete elimination of lead in gasoline for highway use. This provision is unnecessary for health purposes, and costly to farmers and and owners of off-highway and antique vehicles that still require leaded fuel.

Today, "leaded gasoline" contains no more than one-tenth of a gram of lead per gallon. That, coupled with the continuing turnover of "unleaded" vehicles in the national fleet, has resulted in attainment of ambient lead standards throughout the nation. The few remaining lead concerns are site specific and do not require a federal response that is nationwide in scope.

The bill also placed a prohibition on the continued manufacture of motor vehicles requiring leaded fuels. This provision alone will ensure that the marketplace eventually phases out leaded fuel itself. In the meantime, however, there are a handful of individuals who, usually because of depressed economic conditions, continue to depend on leaded fuel vehicles. Many of these individuals live in rural areas where their demand for leaded gas, coupled with that of farmers, is sufficient to make refining, transporting and marketing of leaded gas economically feasible.

In April of 1987, the EPA and USDA reported result of joint study to determine the need for lead in gasoline-powered machinery. The study concluded:

—All engines performed satisfactorily on low-lead gasoline.

—Most engines experience excessive exhaust valve-seat wear when *unleaded* gasoline was used.

—Non-lead additives demonstrated varying ability to reduce valve-seat wear.

—It is estimated approximately 700,000 gasoline powered tractors nationwide are vulnerable to excessive valve-seat recession if operated on *unleaded* gasoline.

—All combine engines are likely to experience excessive valve-seat recession if they have cast iron valve seats and are operated in medium or heavy-duty applications, using *unleaded* gasoline.

—It appears a large number of farm trucks could be vulnerable to excessive valve seat recession if operated on *unleaded* gasoline.

These results clearly illustrate the farm equipment losses that might occur should leaded gas become unavailable. While the Committee bill does not expressly ban unleaded fuel for use in farm equipment, many refineries have already left the leaded fuel market, and the Committee bill's ban on highway use of leaded gas will likely eliminate the refineries remaining. Without leaded gas suppliers, and in the absence of acceptable additives, farm equipment losses could be significant.

3. FUEL QUALITY

The bill also directs the Administrator of EPA to promulgate regulations establishing specifications for fuel quality. This, in essence, would give the Administrator the authority to mandate specific fuel formulations. Because each refinery configuration is different, a mandate such as this could require significant refinery modification or possible force some refineries to close.

The Administrator should be given only the authority to set performance standards which can be satisfied by any fuel achieving comparable emissions reductions. The Administrator must also compare the cost-effectiveness of the performance standards program to that of other ozone reduction strategies before promulgating regulations. This will ensure that the projected air quality benefit justifies the cost of compliance and will allow each fuel supplier to produce fuel which meets these standards in the most cost-effective manner possible.

4. OXYGENATE MANDATE

The Committee bill currently incorporates a provision requiring that fuels with at least 3.1. percent oxygen content be sold in *all* areas classified as nonattainment for CO from October 1st to March 31st each year. In the absence of other avenues through which to encourage domestically produced ethanol to enter the fuel stream, this provision is necessary.

But its cost is significant, and its value to air quality limited. Since its effect would be to require the splash blending of ethanol, and because splash-blended ethanol is currently given a 60 cents per gallon exemption from fuel use taxes, the provision would result in significant loss of revenue to the Highway Trust Fund, the fund out of which we pay for the maintenance and upkeep of the Nation's infrastructure.

Furthermore, the value of splash-blended ethanol to attaining clean air goals is limited, especially since such fuels must necessarily be granted a variance allowing them to meet RVP standards one pound higher than other fuels. Many of the areas where splash-blended ethanol would be mandated will likely reach attainment merely through vehicle fleet turnover, thus eliminating the environmental value of the ethanol blend.

A much better method of utilizing ethanol in the nation's fuel supply is in the production of Ethyl Tertiary Butyl Ether (ETBE). ETBE is a clean burning ethanol- and isobutylene-derived compound, currently unavailable since it cannot compete with cheaper imported, methanol-derived MTBE and splash blends. However, should the U.S. Treasury follow through with their proposed rule to extend the "blenders tax credit" to ETBE[47], the need for a 3.1 percent oxygenate mandate would be greatly lessened. The Committee bill's oxygenate requirement could then be lowered to 2.7 percent or some other level that assures continued clean air improvement and yet leaves highway funds intact.

5. OUTER CONTINENTAL SHELF

The Department of the Interior is currently charged with regulating offshore air quality, including the air quality concerns associated with offshore oil and gas production. It carries out this charge through the offices of the Mineral Management Service (MMS).

The MMS is charged with safety considerations as well as environmental review, which is an important duality of responsibility on offshore drilling rigs. Not every kind of control equipment used "onshore" can be safely used offshore. Because of its ongoing offshore inspections, the MMS maintains a regular presence that is of great value to enforcing and monitoring compliance with offshore air emission standards.

Nevertheless, there are some who have criticized the Department of the Interior for not having done an adequate job. The logical response of the Committee to such an accusation would be to redouble efforts to ensure that Interior does a better job. Unfortunately, the Committee bill does not take the "logical" course.

Rather, it merely places the regulation of offshore sources in the hands of the EPA. Forcing EPA's air quality office to assume authority over an area of the outer continental shelf poses some awkward problems, not least of all being the fact that States, who implement most EPA air quality measures, cannot be expected to regulate sources outside their own borders.

Offshore air emissions should be regulated by the agency that has the best authorities, funding, personnel and resources. Whether that agency is Interior or EPA depends on where the President chooses to place such resources. Because of this very fact, questions of executive reorganization have traditionally been a Presidential prerogative. There is no reason why the Committee should seek to usurp that prerogative now.

IV. ACID DEPOSITION

Title V of the Committee bill is directed at reducing sulfur dioxide (SO_2) and oxides of nitrogen NO_x) emissions believed to be the precursors to acidic deposition. The title is projected to require a 10 million ton annual reduction of SO_2 emissions and an estimated 4 million ton annual reduction in NO_2 both from 1980 levels. Just as was the case with the bill reported from the Environment and Public Works Committee during the 100th Congress (S. 1894), the cost of these provisions are astronomical, their benefits at best are uncertain (and perhaps minimal), and the direct and indirect impacts of such controls on the Nation's economy and ability to compete internationally are great.[48] To adequately address the problems found in this title of the bill, it is necessary to focus on 1) the state of our scientific knowledge about the acid deposition phenomenon, 2) the nature of title V, including the emissions requirements for SO_2 and NO_x, deadlines, innovative technologies, emission trading, and plants under construction and, 3) the economic cost of the title.

---

[47] Announced on November 20, 1989 in a notice of proposed rulemaking (PS–47–89).

A. SCIENTIFIC RESEARCH AND ACID PRECIPITATION

As has been the case with acid rain proposals reported from the Committee in the past, there is a pressing need to point out that legislative action on this issue in advance of the completion of the National Acid Precipitation Assessment Program ("NAPAP") can be viewed as an admission that politics, not science, is the driving force behind this proposal.[49] An often expressed sentiment in hearings, by supporters of the proposal, was that Congress must of necessity rely upon "imperfect information" and that science "points in the direction" of controlling acid deposition.[50] NAPAP's final report is being prepared, however, even as the Committee acted.[51] If Congress now acts on the basis of the Committee's work—literally months before NAPAP hosts a major international conference on the state-of-science and the publication of the Final Integrated Assessment—the Nation could end up wasting the 10 years and one-half billion dollars that have gone into NAPAP.[52] What is perhaps worse is that preliminary research has produced no information that dictates immediate action to address an abrupt deterioration in our environment as the result of acid deposition.[53]

---

[48] See, Clean Air Standards Attainment Act of 1987, Report of the Committee on Environment and Public Works, Report 100-231, 100th Cong., 1st Sess., Minority Views of Mr. Symms and Mr. Warner, pp. 412-433.

[49] The National Acid Precipitation Assessment Program was created by Congress in 1980 (P.L. 96-294).

[50] See, Oral Testimony of Mr. William Rosenberg, Assistant Administrator for Air and Radiation, U.S. Environmental Protection Agency, Hearing before the Subcommittee on Environmental Protection, "Hearing to Consider Results of the NAPAP Research Program into the Causes and Effects of Acid Precipitation," Thursday, October 5, 1989, as yet unpublished transcript, at p. 9.

[51] NAPAP will publish its assessment reports at various scheduled dates in the next eleven months, as described in the *Plan and Schedule for NAPAP Assessment Reports,* released in January 1989.

[52] The NAPAP International Conference on Acidic Deposition—February 11-16, 1990 will focus on critical review of NAPAP's 28 State-of-Science and State-of-Technology Reports which have been developed throughout 1989. Preliminary conference registrations have already been received from more than 600 scientists and other representatives of government, nongovernment and private organizations from over 30 countries.

[53] See, e.g., Testimony of G.M. Hidy, Vice President, Environment Division, Electric Power Research Institute, before the Subcommittee on Environmental Protection Subcommittee, October 5, 1989.

1. THE PARADOX OF NAPAP

Trial lawyers say that no experienced advocate should ask a question unless he already knows the answer a witness will give. In reviewing the history of the NAPAP effort, it is difficult not to reach the conclusion that it has become a paradox—those who in the beginning thought they knew the answers that NAPAP would produce now do not want to hear its unsettling findings; those who were once skeptical of NAPAP, and now want to hear more, are told that NAPAP's findings no longer matter—that the time for study is passed. The important policy question, however, is what do we know as the result of NAPAP research to date? Dr. James R. Mahoney, Director of NAPAP, provided testimony in October of this year to the Subcommittee on Environmental Protection.[54] From that testimony and that of other witnesses who appeared before the Subcommittee, we can draw a number of important facts and conclusions.

(a) Progress Made Under Current Clean Air Act

We know from NAPAP's estimates of annual emissions trends through 1987, with preliminary estimates for sulfur dioxides for 1988, that between 1973, the peak year of sulfur dioxide emissions in the United States, and 1988, sulfur dioxide emissions decreased by 23 percent from approximately 31 to 24 million short tons, despite a 45 percent increase in coal use. The decrease resulted from increased use of low sulfur coal and flue gas desulfurization ("scrubbers"), increased nuclear power production and decreased utilization of some higher emitting powerplants and industrial sources. We also know that emissions of nitrogen oxides peaked in 1978 at 23 million short tons and have since declined. Preliminary estimates of 1988 emissions are 20 million short tons, which is a decrease from 1978.[55]

Obviously, these reductions in emissions are no accident. They are the product of nearly 20 years of national effort and expense. The U.S. now spends over $30 billion annually to control air pollution. In 1970, the Congress increased dramatically the role of the Federal Government in addressing the problem of air pollution. The Clean Air Act empowered it to establish primary and secondary National Ambient Air Quality Standards, which set the maximum allowable concentrations of various air pollutants for all regions of the country. Subsequent amendments to the Clean Air Act in 1977 set more stringent emission limits on existing sources of air pollution and placed stricter requirements on new sources of air pollution. In 1971, EPA set primary standards—designed to protect health—and secondary standards—designed to protect public welfare for each pollutant identified under section 108 of the Clean Air Act—for particulate matter and five other "criteria" pollutants. These pollutants are sulfur dioxide, nitrogen oxides, carbon monoxide, hydrocarbons, and photochemical oxidants. Throughout the country, compliance with these standards is the norm, with the exception of ozone. In fact, according to the 1988 annual Report of the President's Council on Environmental Quality, the "SO_2 (sulfur dioxide) problem, from the standpoint of public health impacts, has essentially been eliminated in the nation."

---

[54] See, Testimony of James R. Mahoney, Director, National Acid Rain Precipitation Assessment Program, before the Subcommittee on Environmental Protection, October 5, 1989.

[55] For all of the foregoing, see, Mahoney testimony at pp. 3–4.

In the areas of the country that already meet national standards, the Prevention of Significant Deterioration provisions of the Clean Air Act require that the quality of the air be maintained at levels cleaner than the health- and welfare-based standards require. These standards allow only the smallest increases in pollution concentrations. Once this level has been reached, any further emissions must be offset by reductions from existing sources. There is no serious question that the Clean Air Act has been working and will continue to protect and improve air quality. As demonstrated by the findings of NAPAP, the Act, through the establishment and enforcement of ambient air quality standards and through preconstruction review of new sources of emissions, has been successful in controlling and reducing the precursors to acid precipitation—sulfur dioxide and oxides of nitrogen.

According to Dr. Mahoney, future levels of anthropogenic emissions of these precursors of acid precipitation will be determined by many factors in addition to implementation of any new emissions controls. Among the most important factors for sulfur dioxide emissions are regional patterns of population growth, future energy demand and the rate of retirement or repowering of older, higher emitting plants.[56] This conclusion in fact suggests to many that the development of clean coal technology, the planned retirement of repowering of older coalfired power plants, the Prevention of Significant Deterioration standard, and the New Source Performance Standards—all a part of the current national clean air effort—will lead to further decreases in sulfur dioxide and nitrogen oxide emissions, without new emissions controls.[57]

While the improvement in air quality and the decrease in emissions of suspected precursors to acid precipitation have been dramatic under the Clean Air Act, these benefits have not been obtained without significant cost. The price tag for all air pollution controls has been estimated as being $31 billion annually.[58] EPA reports that the electric utility industry alone spends about $10 billion annually. Pollution controls account for more than one-third of a new coal-fired powerplant's cost.[59] A single scrubber may cost $100 million or more, and capital costs for adding scrubbers to older plants can sometimes equal or even exceed the original plant investment. Presently, there are approximately 150 scrubbers installed at U.S. utility plants and nearly 50 or so additional units are planned or under construction.

The results achieved under the Clean Air Act, and documented by NAPAP, demonstrate that the Congress has been acting responsibly by refraining from enacting new controls. The Clean Air Act has served us well as a successful and flexible set of mechanisms to deal with acid rain precursors. On that basis, it is fair to ask what science to date has shown us about acidic deposition on aquatic ecosystems, forests, crops, exposed materials, human health and visibility in the atmosphere. NAPAP has sponsored extensive research in the first of these four categories and monitors and evaluates research on the effects of acidic deposition on health and visibility. Below is a very brief summary of each the major NAPAP findings to date.

---

[56] See, Mahoney testimony at p. 4.

[57] See, e.g., discussion of EPA revised, biennial base case emissions forecast in the testimony of Mr. Richard Lawson, President, National Coal Association, before the Subcommittee on Environmental Protection, October 3, 1989, ftn. 18. at p. 18.

[58] Bureau of Economic Analysis, *United States Department of Commerce News*, "Real Pollution Abatement and Control Increased Again in 1985," (June 3, 1987) at p. 2.

[59] See, Testimony of Mr. Paul Schechel, Chairman and CEO of Montana Power Company, before the Subcommittee on Environmental Protection, October 4, 1989, at p. 2.

(b) Aquatic Effects

NAPAP has revealed that in areas once thought in particular jeopardy only a minor fraction of lakes are acidic, that the origins of acidification are not well documented, and that predictions for improvement through additional reductions in sulfur dioxide emissions are very speculative. For example, only 5 percent of the lakes in the northeast are currently acidic; that is, they have no buffering capacity.[60] In the northeast, under constant deposition, little further chemical change is expected because systems are at a steady state.[61] In the Southern Blue Ridge there are presently no acidic lakes, and only 10 percent are at risk of becoming so over the next 20 to 50 years.[62] Acidic lakes have been found in the Michigan peninsula and northern Wisconsin.[63] The highest percentage of acidic lakes has been found in Florida, where conditions other than acidic deposition are major contributors to the acid problem.[64] Moreover, in hearings before the Environmental Protection Subcommittee, Senator Moynihan drew out from NAPAP officials the judgment that a 30 percent reduction from current deposition levels would, in 20 years, improve the condition of only 26 lakes in the northeast and that over 50 years, only 75 to 80 lakes would see improvement. (See Excerpt #1). In other words, even when conservatively estimated at $4 billion in annual cost, a new emissions control effort would yield results that might be more immediately and cheaply had by the expenditure of $5 million for the liming of these same lakes.

---

[60] See, Oral testimony of Mr. Mahoney, transcript, at p. 17.

[61] *Id.* at p. 20.

[62] *Id.* at pp. 24–26.

[63] *Id.* at p. 17.

[64] *Id.*

THURSDAY, OCTOBER 26, 1989 The Washington Times SECTION F

CLASSIFIED
STARTS ON PAGE F5

COMMENTARY

EDITORIALS
PAGE F2

Excerpt # 1

WARREN BROOKES

On gold-plated ponds

At a hearing on Oct. 5, members of the Senate Subcommittee on Environmental Protection discovered that the Bush administration acid rain program is expensively futile.

A preview of the 1990 final report by the National Acid Precipitation Assessment Project shows the Bush proposal to spend up to $4 billion to $6 billion a year to cut sulphur dioxide emissions will deacidify only 26 lakes in the Northeast after 20 years — and only 75 lakes after 50 years. (See table.)

This means a 20-year cumulative cost of almost $5 billion per deacidified lake and after 50 years about $4 billion per lake. (By contrast, the 20-year cost of liming the average lake is less than $50,000.)

In his report to the Senate, James Mahoney, NAPAP director, admitted that even this scandalously small projection of benefits from the proposed Clean Air Program was iffy because: "There are significant uncertainties about the role that watershed mineral processes, organic acids and nitrates (in the soils) may play in the acidification and recovery process."

This is "science-ese" for admitting that, despite protestations, NAPAP knows there is very little correlation between acid-rain levels and acid lakes. For example, Mr. Mahoney acknowledged that the highest acid lake concentration in any U.S. state is in Florida. Yet Florida gets hardly any acid-rain deposition, and, as Mr. Mahoney noted, its acid lakes were the result of natural causes.

Also contrary to spurious "new (but unreleased) research" by the Environmental Protection Agency, published geological core studies show that more than 80 percent of the acidic Northeast lakes were acidic in pre-industrial times.

Dr. Mahoney had to tell the Senate that "determining the precise percentage of acidic waters due wholly or in part to acidic deposition carries with it scientific and statistical uncertainties." This statement directly counteracted the propaganda with which EPA Director William Reilly had practically insisted that Mr. Mahoney lead his statement.

Mr. Mahoney granted that "the effects of constant, increased and decreased acid-rain deposition are not always statistically significant." Indeed they are not, either here or abroad.

In fact, the EPA's own data shows that land use and soil composition are at least three times as statistically significant "causes" of acidic lakes as acid rain.

> *The NAPAP analysis shows that acid rain is not a serious problem, and the costs of SO_2 reduction are ludicrously out of line with the benefits.*

This is why NAPAP was forced to project that even if we do nothing, the number of acidic lakes in the Northeast will actually *decline* by one in the next 20 years, to a total of 161 and will only rise to 186 by the end of the next 50 years. Mr. Mahoney admitted, "What that really means, statistically, is no change at all."

Worse, even if we do as the Bush proposal suggests and cut SO_2 emissions by 10 million tons a year, raising electric bills in the Midwest by as much as $900 a year in Ohio, $630 in Indiana and Pennsylvania, $520 in Missouri, and more than $400 a year in Tennessee, West Virginia and Illinois, little will change.

When Democratic Sen. Daniel Patrick Moynihan of New York, a cosponsor of the Bush Clean Air Program, heard this, he began to raise some carefully soft-spoken hell: "No matter what legislation we pass, about 10 percent of the lakes are going to be acidic beyond the lifetime of anybody in this room? We have to ask ourselves, is that the best way to spend $4 billion a year?"

It is especially questionable when all of the lakes in North America could *definitely* be deacidified immediately by boat-liming, at a cost of less than $400,000 a year total!

But what about other effects of acid rain on forests and crops? NAPAP Director Mahoney admitted: "Research has established that there is no measurable and consistent adverse crop-yield response from the direct effects of acidic rain at ambient levels in North America."

On the contrary, "an evaluation of the nutritional enrichment of some agricultural soils through the input of sulfur and nitrogen from acidic deposition indicates indirect benefits associated with decreased fertilizer requirements."

But what about trees? NAPAP said that "other than for red spruce, extensive surveys of forest condition have indicated no evidence of widespread forest decline in North America related to acidic deposition."

Even on red spruce, NAPAP said the effects were limited to about 6 percent of the forests, all at high elevations (above 2,600 feet), and added, "Several natural stresses are related to these declines (droughts, freezes, diseases, etc.); and acid rain *may* intensify the effects of the natural stresses." (Emphasis added.)

In short, the NAPAP analysis shows now what it did in 1987: Acid rain is *not* a serious environmental problem (Mr. Moynihan concluded, "The sky is not falling"), and the costs of SO_2 reduction are ludicrously out of line with the benefits.

It's a scandal waiting to be legislated.

Warren T. Brookes is a nationally syndicated economics columnist.

THE HIGH COSTS OF REDUCING ACID RAIN

	Number of acidic NE lakes	Cumulative costs of SO_2 reduction	Cumulative costs to lime all NE acidic lakes
This year	162	$4-6 bill./yr.	$400,000/yr.
20 Years From Now			
■ No Program	161	—	—
■ Liming	0		$8 million
■ Bush Program	136	$120 billion	—
50 Years From Now			
■ No program	186	—	—
■ Liming	0		$20 million
■ Bush Program	87	$300 billion	—
20-year Cost per Lake Changed From Present			
■ Liming			$50,000
■ Bush Program		$5 billion	

Source: Based on NAPAP Oct. 5, 1989, Report, Senate Subcommittee on Environmental Protection

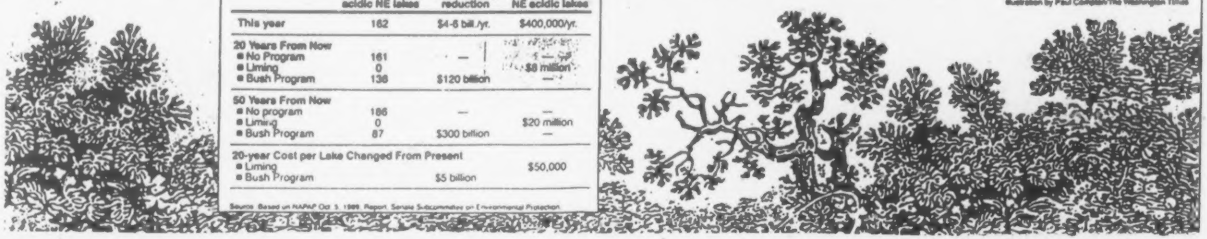


Illustration by Paul Compton/The Washington Times

At the acid lake hearing

Edited exchange between National Acid Precipitation Assessment Project director James Mahoney and Democratic Sen. Daniel Patrick Moynihan of New York, Oct. 5, 1989, Senate Subcommittee on Environmental Protection.

Mr. Mahoney: If there there were no change in acid deposition from current levels, we would expect that in the Northeast the chemical status of the lakes would stay approximately the same over the next 50 years.

Mr. Moynihan: You're saying that . . . the lakes in the Northeast are in a steady state? Is that right?

Mr. Mahoney: Right.

Mr. Moynihan: Suppose we doubled the acid-rain deposition? Would that have any consequence?

Mr. Mahoney: Not much. We have a percentage of acid lakes (5 percent) and no matter what we do over the next century except for restoring them one at a time through liming, little is going to change that quickly.

Mr. Moynihan: Over the next century? So let's say we decided to get the most sulfurous coal conceivable out of West Virginia and Ohio . . . and took all the scrubbers off [the smokestacks] and just banged away [with SO_2 emissions], that the present 10 percent of lakes would remain at an unacceptable acidic content, and the rest would remain OK?

Mr. Mahoney: That percentage would increase slightly . . . it might be 11 or 12 percent.

Mr. Moynihan: So we are not dealing with a tender sensitive young organism that can change its condition. . . . no matter what legislation we pass, about 10 percent of the lakes are going be to acidic beyond the lifetime of anybody in this room.

[Editor's note: One of NAPAP's problems is that a large share of acid lakes in the United States are in areas like Florida where there is little or no acid-rain deposition, suggesting that lake acidity has many other natural and geological causes independent of SO_x.]

Mr. Moynihan: You find a very high level of acidification of lakes in Florida. Is that right?

Mr. Mahoney: Yes, sir . . . 22 percent of the lakes in Florida . . . are acidic lakes . . . .

Mr. Moynihan: And this is not primarily associated, or even perhaps predominantly, with acid-rain deposition?

Mr. Mahoney: That's correct.

Mr. Moynihan: It has to do with the geology of the area, the plants?

Mr. Mahoney: Yes. And with the decaying organic materials introducing organic acids to the lakes . . . .

[Editor's note: Contrary to Environmental Protection Agency claims, most published research papers show that paleolimnological studies show that even in the Northeast, the majority of currently acidic lakes were acidic in pre-industrial times.]

Mr. Moynihan: If the present pattern of acid deposition continued unchanged . . . what would happen to [lakes in the Northeast]?

Mr. Mahoney: If . . . we look at the time 20 years from now and then 50 years from now, we see that if deposition is unchanged, we don't expect any significant change.

Mr. Moynihan: Now if we go to a decreased deposition [10 million-ton reduction], in 20 years we pick up 26 lakes?

Mr. Mahoney: Yes, sir.

BROOKES

From page F1

Mr. Moynihan: One lake a year. And we'd go from 5 percent down to 4 percent acidic lakes in the Northeast?

Mr. Mahoney: That's correct.

Mr. Moynihan: Over 50 years you'd pick up 80 lakes or 75?

Mr. Mahoney: Yes.

Mr. Moynihan: Well, what are the costs.?

Mr. Mahoney: We are doing control cost estimates but we don't have them available at this time, so I can't make our own up.

Mr. Moynihan: Mr. Rosenberg? [William Rosenberg, deputy EPA administrator]

Mr. Rosenberg: We estimate about $4 billion a year.

Mr. Moynihan: $4 billion a year? OK, so we have to ask ourselves whether . . . that is the best way to spend $4 billion a year. We could, with that money give every welfare family [in New York State] $12,000 to vacation in the Adirondacks on some of the 95 percent of the lakes that are not acidic. Does it hurt to swim in acidic water?

Mr. Mahoney: No, sir, not in this range.

[Editor's note — Mr. Moynihan and Republican Sen. John H. Chafee of Rhode Island then had the following exchange with Walter Kretser, project director, New York State Adirondack Lakes Survey Corp., which deals with the uncertainty as to how many of those lakes were actually acidified by SO_x, and how many from reforestation since 1920.]

Mr. Moynihan: If you know the Adirondacks, it is kind of disillusioning to find out that it is not virgin forest. It was stripped bare. There wasn't a twig left when Theodore Roosevelt bought it for 10 cents an acre [in 1906]. We have since measured everything from the first robin to appear to the last leaf to drop from the yellow aspen. But the one thing they never recorded was the pH content [acidity] of the lakes. So if I asked you if there are more acidic lakes in the Adirondacks today than there were in 1900, you would have to answer . . .

Mr. Kretser: We don't know the answer to that.

Mr. Chafee: But if it is going to cost us $4 billion to have these [SO_2 emission controls] . . . what is your recommendation to us about proceeding with those controls?

Mr. Kretser: I have no idea what the effect will be with SO_2 controls. A certain percentage of our lakes we expect would respond. We don't even know what that percentage is.

Mr. Chafee: Let me put it another way: Do you think that sulfur emissions have caused damage to the lakes you studied?

Mr. Kretser: A certain proportion, yes. But I cannot name that proportion.

Mr. Moynihan: People involved with the environmental movement . . . get very nervous when they hear the subject of research. . . . I would make the point that people who fear research might find out things that you don't want, or that they might be inconclusive. We went through eight years of the previous administration on acid rain and every time anybody went into the White House or the Office of Management and Budget and said they think we should do something, they were met with a fairly sophisticated inquiry of why. Invariably these questions had no response. There was no answer. And now we begin to know. In many ways it is very reassuring. It suggests to me that the sky is not falling. I am glad to hear that.

[Editor's note: Unfortunately the NAPAP report and testimony has so far not been heard or requested by any of the House subcommittees working on the acid-rain legislation.]

(c) Forests

As a result of NAPAP research and other studies conducted in the past several years, we now know the following about the supposed wide-spread damage caused by acid rain on forests: acidic deposition appears to intensify the effects of natural stresses upon red spruce at eastern high elevation locations (only about 6 percent of total area of eastern spruce-fir are at high elevations); and, other than for these red spruce, extensive surveys of forest conditions have indicated no evidence of widespread forest decline in North America related to acidic deposition.[65]

(d) Crops

NAPAP research has established that there is no measurable and consistent adverse crop yield response from the direct effects of acidic rain at ambient levels in North America. Thus, the acidic deposition impact on regional crop production in the U.S. is considered to be negligible. In fact, an evaluation of the nutritional enrichment of some agricultural soils through the input of sulfur and nitrogen from acidic deposition indicates indirect benefits associated with decreased fertilizer requirements.[66]

(e) Materials

The relationship between acidic deposition rates and deterioration of rates for various materials have been studied in the NAPAP program. There are, however, serious limitations in developing representative data and interpretive methods to isolate and inventory effects on materials. As a result, there are no generally acceptable regional or national estimates of materials effects resulting from acidic deposition. Moreover, acidic deposition is only one element of air pollution exposure for materials and, thus, reductions in other urban pollution may be more important than reductions in acidic deposition. In its final assessment in 1990 NAPAP will try to report bounding estimates of the materials benefits related to reductions in acidic deposition.[67]

(f) Visibility

Research indicates that sulfates and NO_x play a role in limiting visibility in the eastern United States.[68] Reductions in visibility are, however, strongly influenced by humidity and urban air pollution unrelated to these chemicals.[69]

2. THE DISREGARD FOR NAPAP

For over a decade, the approach of acid precipitation control advocates has been to make sweeping, unsupported allegations of irreversible environmental damage in hopes of creating a consensus that the problems attributed to acidic deposition are so pervasive and so serious that the Nation must pay any price and bear any burden to control it. This approach was possible for the simple reason that science was aware of few of the facts concerning acid precipitation. NAPAP is about to put those days behind us forever. Will it matter? Apparently not. NAPAP has accumulated a wealth of data and established many facts, but, even as the science improves, the legislation gets worse. The Committee-passed bill represents a classic case of legislative overkill and, worse, it comes at a very high price. As will be discussed later, it will have staggering, negative impacts on utility rates, employment, U.S. industrial competitiveness, and other elements of our national economy.

---

[65] Testimony of Mahoney, at p. 17.

[66] *Id.* at pp. 18–19.

[67] *Id.* at pp. 20–21.

[68] Staff Memorandum, Subcommittee on Environmental Protection, "NAPAP and the Scientific Understanding of Acid Deposition," October 5, 1989, at p. 5.

[69] Testimony of Mr. Hidy at Appendix B.

While those who support the bill are sincere and believe they must act now, the minority believes that NAPAP is thoroughly repudiating the idea that we are facing an environmental disaster of enormous magnitude. The urge to act, despite the lack of evidence of anything approaching an environmental crisis, ignores the progress we have already made in dealing with SO_2 and NO_x, ignores the preliminary NAPAP findings, ignores national economic concerns, and, specifically, puts the prosperity of several regions of the country at substantial risk. The failure of Congress to heed the advice that it has sought from the scientific community through NAPAP is a failure of political nerve. It should signal to those who are examining the Committee's work for the first time that the rule of *caveat emptor* is in full force. In other words, the pursuit of "environmental goals" has led the Committee to produce a bill very similar in its content and impact to S. 1894 in the 100th Congress.

3. THE TRUTH ABOUT HEALTH EFFECTS

In certain testimony before the Committee, and in some of the statements of the Members, claims were made regarding the health effects of the pollutants associated with acid deposition in an effort to bolster the case for adopting legislation calling for additional reductions in the emissions of those pollutants. Specific claims were directed at the effects of short-term exposures to sulfur dioxide (SO_2) on asthmatics, the morbidity and mortality implications of acid aerosol exposures, the possible mobilization of metals in drinking water by acid deposition, and the contribution of the emissions of nitrogen oxides (NO_x) to health effects. Taken together, these claims offer speculation, present a narrow view of a portion of a large data base, represent an uncritical evaluation of problematic research, and/or ignore the role of EPA in setting primary national ambient air quality standards to protect the public health with an adequate margin of safety based on the totality of scientific evidence. A review of how the health experts at EPA and elsewhere have considered and rejected the acid rain health effect claims indicates that comfort can be taken in the protection provided by our ambient standards. As a result, we can focus the debate regarding acid deposition on the issue of whether or not aquatic and terrestrial ecosystems need the additional protection that further reductions in the emissions of the precursors to acid deposition might provide.

(a) The Current Clean Air Act

Section 109(b)(1) of the Clean Air Act mandates that EPA establish primary ambient standards the attainment of which will protect the public health with an adequate margin of safety. To be based on state-of-the-art science,[70] these standards and the evidence to support them are to be reviewed at least every five years and the standards are to be revised as necessary.[71] To ensure that the Agency has the most up-to-date information on which to base its regulatory decisions, the Clean Air Scientific Advisory Committee (CASAC) is to provide additional technical input to EPA.[72]

EPA has promulgated ambient standards for several pollutants, including sulfur oxides (SO_x, including particulate and aerosol sulfates), nitric oxides (NO_x, including particulate and aerosol nitrates), particulate matter generally (including both sulfates and nitrates), and ozone.[73] While there is no ambient standard specifically denominated for the general class of pollutants known as "acid aerosols," they are a subset of three of the pollutants listed above: SO_x; NO_x; and particulate matter. Thus, when standards are set for these pollutants, those standards implicitly take into account the effects of acid aerosols such as sulfates and nitrates. Similarly, the controls required to attain the ambient standards for these pollutants reduce the ambient concentrations of acid aerosols.

Accordingly, a comprehensive regulatory program has been put in place and vigorously enforced so as to produce significant reductions in emissions. While more needs to be done to bring the entire country into compliance with all of the ambient standards, the problems associated with the implementation of the ambient standards are not attributable to the substance of the Clean Air Act or to EPA's standards. As a result, further efforts to protect public health are not dependent on new legislation. On the contrary, and as explained below, reliance on the experts at EPA to consider the evolving and controversial scientific evidence is a more prudent course of public health protection than is having Congress consider that portion of the health evidence that a small number of witnesses decide to adduce. As a result, because confidence can be placed in EPA's evaluation of the available evidence, the acid deposition debate can be focused on environemntal—not health—issues.

(b) The Asthmatic Response to SO_2

There are two primary ambient standards for SO_2: one for annual and one for 24-hour time averages.[74] During the 1980's, EPA has considered the need to revise these standards and to adopt a new one-hour standard. This review included an assessment of (1) the available human clinical evidence that indicated that asthmatics were especially sensitive, while exercising, to short-term concentrations of SO_2 and (2) the likelihood that asthmatics would exercise in ambient levels of SO_2 high enough to cause an adverse health effect. After this review, EPA published on April 20, 1988, a Federal Register notice soliciting public comment on their proposal to reaffirm the current ambient standards for SO_2 and not to adopt a new one-hour SO_2 standard. These proposals were based on the factual record that indicated to EPA that the current standards adequately protect the public health.[75] The comment period has closed and EPA is conducting additional analyses in light of the public comments.

---

[70] Sections 109(b)(1) and 108(a)(2) of the Clean Air Act.

[71] Section 109(d)(1) of the Clean Air Act.

[72] Section 109(d)(2) of the Clean Air Act.

[73] 40 C.F.R. sections 50.4, 6, 9 and 11.

[74] 40 C.F.R. section 50.4. There is also a 3-hour average secondary ambient standard designed to protect the public welfare from known or anticipated adverse effects. 40 C.F.R. section 50.5.

EPA's analysis is straightforward. In its Federal Register notice, the Agency stated that "the available information on potential effects associated with short-term exposure to SO_2 and their relative frequency of occurrence given current conditions does not justify an additional level of protection" beyond that provided by the present ambient standards.[76] EPA explained that the effects "appear to be transient and reversible" and that at SO_2 concentrations below 0.75 ppm "they are with the range of day-to-day variations that most asthmatics typically experience from exercise or other stimuli." [77] The Agency also noted, "It is likely that the incidence of bronchoconstriction induced by SO_2 is very small compared with that induced by factors unrelated to pollution." [78]

Given the EPA's apparent unwillingness to accept their view of these data, witnesses before the Committee urged Congress to intervene in this orderly administrative proceeding and require further emissions reductions.[79] The arguments presented on the frequency and severity of the health effects of short-term SO_2 exposures are unpersuasive in light of EPA's careful analysis.

Fortunately, there were witnesses before the Committee that reinforced the EPA work. Directors Regis McFadden and Donald Proctor explained that the human clinical studies upon which the contrary view is based are problematic in light of the flaws in their methodology and statistical analysis, and of the fact that the response of asthmatics to low levels of SO_2 occur only when they are at exercise, that response is modest and rapidly resolved, and it does not produce sensitization to other stimuli.[80] In fact, the reactions observed in the laboratory of exercising asthmatics to SO_2 concentrations are routinely encountered in their daily lives:

> It is important for the committee to appreciate that shoveling snow, for instance, walking briskly on a cold day, laughing vigorously, sighing, or even going to bed and to sleep will produce changes in lung function equal to or greater than those observed with sulfur dioxide at the concentrations of concern.[81]

---

[75] 53 Fed. Reg. 14926 (1988).

[76] 53 Fed. Reg. 14934 (1988).

[77] 53 Fed. Reg. 14932 (1988).

[78] 53 Fed. Reg. 14932 (1988).

[79] Health Effects of Air Pollution: Hearing Before the Subcommittee on Environmental Protection of the Senate Committee on Environment and Public Works, 101st Cong., 1st Sess. (April 18, 1989) [hereinafter April 1989 Hearing Record]—(including testimony of Dr. Bailus Walker at page 16 of the hearing record, among others).

[80] April 1989 Hearing Record at pp. 50–51 (Statement of E. Regis McFadden, University Hospitals of Cleveland) and at pp. 141–149 (Statement of Donald F. Proctor, M.D.).

[81] April 1989 Hearing Record at pp. 50–51 (Statement of Dr. McFadden).

Moreover, exposure analyses indicate that, of asthmatics, only 1 percent is likely to experience modest SO_2-induced responses in a year when they are likely to experience many responses that are as, if nor more, severe than the SO_2 response.[82]

In light of this data, EPA's analysis seems very reasonable.

(c) The Health Effects and Acid Aerosols

The health effects of acid aerosols are implicitly accounted for in the ambient standards for SO_x, NO_x, and particulate matter. Similarly, emission reductions associated with the efforts to attain these standards work together to reduce the ambient concentrations of acid aerosols.

To ensure adequate protection of the public health, however, EPA initiated—with the supervision of its scientific advisory committee (CASAC)—a factual inquiry to determine whether a separate ambient standard is needed for acid aerosols. Based on that inquiry, EPA concluded that no standard for acid aerosols could now be justified. In fact, the Agency staff recommended deferral, pending further research, of a decision on the need to take regulatory action on the acid aerosol issue.[83] EPA's scientific advisors, members of the CASAC, concurred with this judgement and made specific research recommendations for the Agency to consider as it seeks to augment the record on the acid aerosols issue so that future regulatory decisions can have a sound factual base.[84]

EPA's views on this matter are contained in its Issue Paper on Acid Aerosols,[85] which summarizes the data from a host of animal toxicological studies, human clinical studies, and epidemiological studies. That Issue Paper justifies the Agency's position. For example, the concentrations of acid aerosols that have been examined in the toxicological studies of animals have been exceedingly high, often over a thousand times the highest ambient level recorded. No changes in airway resistance have been produced in most healthy animals at the extremely high level of 1000 $\mu g/m^3$ (measured as H_2SO_4). Only the guinea pigs exhibited an effect, bronchoconstriction, and that only at the high level of 100 $\mu g/m^3$.[86] No effects have been reported below 100 $\mu g/m^3$.[87] In comparison, EPA indicates that the peak reported acid aerosol level in Canada is 75 $\mu g/m^3$ (measured as SO4-2)[88] and in the United States is 41 $\mu g/m^3$ (measured as H^2SO^4).[89] Most measured ambient acid aerosol levels are under 5 $\mu g/m^3$.[90] Thus, the threshold for the onset of health effects (at least as demonstrated in animal studies) appears to be well above typical ambient levels of acid aerosols.

In addition, the clinical research on the response of humans to acid aerosols may be divided into two subsets: studies involving healthy individuals and studies involving asthmatics. No effect of acid aerosols at concentrations below 1000 $\mu g/m^3$, alone or in combination with other pollutant gases (notably ozone or SO_2), has been found for healthy subjects.[91] At about 1000 $\mu g/m^3$ H_2SO_4, small pulmonary function changes have been reported.[92] This concentration is over 200 times typical ambient concentrations, and 25 times the peak ambient concentrations.[93] Adult asthmatics (some of whom were exercising) exposed to sulfuric acid aerosols in the range of 400 $\mu g/m^3$ to 1000 $\mu g/m^3$ (well above peak ambient levels) have exhibited "modest bronchoconstriction and small decrements in spirometry." [94] Adult asthmatics have not responded to acid aerosol levels below 400 $\mu g/m^3$ with or without exercise.[95] One group of investigators, however, has reported "small" pulmonary function changes in exercising adolescent asthmatics exposed to sulfuric acid aerosol concentrations in the range of 68 to 100 $\mu g/m^3$.[96] Even this finding far exceeds ambient levels of acid aerosols.

---

[82] April 1989 Hearing Record at p. 51 (Statement of Dr. McFadden).

[83] U.S. Environmental Protection Agency, Acid Aerosols Issue Paper (Draft February 1988).

[84] CASAC Subcommittee on Acid Aerosols, "Report on Acid Aerosol Research Needs, "prepared for EPA (December 15, 1988).

[85] U.S. Environmental Protection Agency, Acid Aerosols Issue Paper (Draft February 1988) [hereinafter "1988 Draft Issue Paper"].

[86] 1988 Draft Issue Paper, pp. 4-44 to 4-45.

[87] 1988 Draft Issue Paper, pp. 4-44 to 4-45.

[88] 1988 Draft Issue Paper, p. 2-51 (citing specific studies).

[89] 1988 Draft Issue Paper, p. 2-51 (citing one study).

[90] 1988 Draft Issue Paper, p. 2-51.

Finally, as stated in the 1988 Draft Issue Paper at page 6-24, "no epidemiological studies have related health effects to measured elevated acid aerosol concentrations alone." A group of American studies of children in summer camp have found no association between pulmonary functions and acid aerosol levels up to about 6 μg/m3.[97] Other epidemiological studies have suffered from one of two major limitations and are not useful for assessing the effects of acid aerosols: (1) a lack of direct measurement of acid aerosol levels; and (2) the presence of other pollutants at elevated levels confounding the inquiry into the effects of ambient levels of acid aerosols. Thus, the 1988 Draft Issue Paper recommends additional epidemiological research to determine whether current levels of acid aerosols in the ambient air pose any threats to public health.[98]

---

[91] 1988 Draft Issue Paper, pp. 5-3 to 5-6 (citing specific studies).

[92] 1988 Draft Issue Paper, p. 5-5 (citing specific studies).

[93] 1988 Draft Issue Paper, pp. 2-42 to 2-51.

[94] 1988 Draft Issue Paper, pp. 5-18 to 5-29, 5-40 (citing specific studies).

[95] 1988 Draft Issue Paper, pp. 5-18 to 5-29 (citing specific studies).

[96] 1988 Draft Issue Paper, pp. 5-21, 5-24, 5-40 (citing specific studies). A witness before the Committee reinforced EPA's views with the following discussion:

> Human clinical studies have not demonstrated any effects of acid aerosols in the range of known ambient levels (which can apparently range from about 4-50 $\mu g/m^3$ during episodic conditions). The studies do show that, at higher levels, asthmatics who are exercising or breathing through a mouthpiece (a problem discussed above) are more sensitive to sulfuric acid than are normal subjects. Even in such asthmatics, however, only modest bronchoconstriction has been found at concentrations of 400-1000 $\mu g/m^3$ (Utell et al. 1983) and either no effects or minimal reactions have been found at concentrations of around 100 $\mu g/m^3$ (Utell et al. 1983, Linn et al. 1986; Horstman et al. 1986; Koenig et al. 1983, 1985, 1989). In a recent report, Hackney et al. (1989) concluded that "[t]he aggregate results suggest that only mild, if any short-term respiratory irritant effects are likely at acid concentrations attained in ambient pollution." Such responses, like the responses of exercising asthmatics to SO_2, are not indicative of a threat to health. Moreover, "[e]xposures to combinations of sulfates with other pollutant gases, most notably ozone and SO_2, have not demonstrated any evidence of synergistic or interactive effects with endpoints that have been measured in human exposure studies" (EPA 1988a, pp. 5-40).

April 1989 Hearing Record at p. 151 (Statement of Donald F. Proctor, M.D.). Similarly, at the symposium convened to discuss the health effects of acid aerosols, Dr. Larry Folinsbee summarized the literature; his summary paralleled EPA's views:

> On the one hand, Koenig et al. found modest decreases in FEV1, FEF50 and other measures of lung function in adolescent asthmatics after a 40-minute exposure to 69 $\mu g/m^3$ of 0.55 um droplets of H_2SO_4. There was no significant increase in symptoms reported by the adolescent asthmatics. In contrast, Hackney et al. studied adult asthmatics exposed to up to 2000 $\mu g/m^3$ of either 10 um acid fog or 0.9 um acid aerosol. The adult asthmatics showed pulmonary function effects from the smaller acid aerosol at concentrations in the 1000 $\mu g/m^3$ range, but not at the lower concentrations.
>
> Further studies on adolescent asthmatics will be required to confirm these observations and to provide evidence that a dose-response relationship exists for acid-aerosol-induced changes in spirometry in this subpopulation.
>
> In addition to H_2SO_4 aerosol, Keonig's subjects were also exposed to sulfur dioxide (SO_2) or the combination of acid and SO_2. Spirometeric indices of lung function did not show any greater effects with mixture of SO_2 and acid than with acid alone.

Folinsbee, "Human Health Effects of Exposure to Airborne Acid," 79 Environmental Health Perspective 195, 197 (1989) (citations omitted).

[97] 1988 Draft Issue Paper, pp. 6-7 to 6-8, 6-27 (citing specific studies).

Based on these data, the Agency staff recommended deferral, pending further research, of a decision on the need to take regulatory action that would augment the controls on the emissions of the precursors of acid aerosols.[99] CASAC concurred with this judgment and made specific research recommendations for the Agency to consider as it seeks to augment the record on the acid aerosols issue so that future regulatory decisions can have a sound factual base.[100]

Against this backdrop, the claims of certain of the witnesses before this Committee are revealed as extreme and unsubstantiated. These claims cover an array of subjects from excess mortality to bronchospasm in asthmatics, and acute and chronic bronchitis in all exposed persons. For example, it was asserted before the Committee that "researchers at Harvard University have concluded that acid rain and its precursors contribute to approximately 5 percent of the premature deaths in the United States—1 death out of every 20." [101] But the Harvard researchers themselves present a very different view of the work that they have reported:

> Although quite intriguing, these [our] results [regarding mortality and aerosol concentrations] must yet be viewed as *suggestive rather than conclusive* because of *the preliminary nature of the analyses.* Further model specifications and methodological extensions are needed to confirm our findings. Also, due to statistical collinearities between the FP [fine particle] and sulfate variables it was not possible in our analyses to discriminate the effects of these pollutants in joint regressions.[102]

In follow-up articles, Harvard researchers continued to report similar reluctance to reach the claim reported to the Committee:

> Although the FP (fine particles) and SO_4 mortality risk coefficients shown in Tables III, IV, and V were often significant, *we advise caution* in their use. We especially emphasize: the limitations of the number and type of exploratory variables used; the sensitivity of these coefficients to model specification; and *other potential uncertainties* not directly

---

[98] 1988 Draft Issue Paper, p. 6–28.

[99] 1988 Draft Issue Paper, p. 7–28.

[100] CASAC Subcommittee on Acid Aerosols, "Report on Acid Aerosol Research Needs," prepared for EPA (December 15, 1988).

[101] April 1989 Hearing Record at p. 38 (1989) (Opening Statement of Hon. Joseph I. Lieberman, M.S. Senator from the State of Connecticut) (probably referring to the statements of Dr. Walker at p. 16).

[102] Ozkaynak and Spengler, "Analysis of Health Effects Resulting From Population Exposures to Acid Precipitation Precursors," 63 Environmental Health Perspective 45, 54 (1985) (emphasis added).

> addressed by our analyses (e.g., *measurement errors* in the exposure variables).[103]

In a scientific meeting expressly convened to discuss the health effects of acid aerosols, this and other epidemiological evidence was considered. Dr. Carl Shy, the expert charged with summarizing the epidemiological evidence, came to a very different conclusion than the one presented by certain witnesses before the Committee:

> In fact, none of the studies [epidemiological] reported at this session implicates acid aerosols, or any one specific pollutant, as the causal agent of the observed effects on morbidity.[104]

Thus, the mortality claims made in conjunction with the Committee's action, especially that predicated on the Harvard research, should be discounted.

Other claims by witnesses before the Committee about the linkage between mortality and acid aerosol exposure were based on a digest by the Office of Technology Assessment (OTA) of so-called macroepidemiology.[105] Interestingly, the reason that the Harvard researchers conducted their analysis on this issue was because they distrusted the literature on which OTA relied.[106] A brief review of that OTA analysis and its factual underpinnings indicates why it cannot be used as the basis for public policymaking.

In its "criteria document" on the health effects of SO_x and particulate matter, EPA examined all of the literature, including that literature that OTA considered. The Agency found the basis for the OTA work to be of insufficient validity and did not use it or the OTA analysis in developing ambient standards. A review of that "criteria document" and the scientific evaluation by other experts of the OTA work indicates that the OTA analysis makes four fundamental errors:

(a) OTA's estimation of ambient sulfate concentrations and population exposures to them are uncertain;

(b) the OTA methodology is based on unreliable statistical analyses that attribute health effects to air pollution without adequately accounting for other factors and generated results with numerous unexplained inconsistencies;

---

[103] Ozkaynak and Thurston, "Associations Between 1980 U.S. Mortality Rates and Alternative Measures of Airborne Particle Concentration," 7 Risk Analysis 449, 459–60 (1987) (emphasis added).

[104] Shy, "Review, Discussion, and Summary of Epidemiological Studies," 79 Environmental Health Perspective 87, 190 (1989). A witness before the Committee concurred in the importance of this symposium and its conclusions:

> A recent symposium (Environmental Health Perspectives, Volume 79, Feb. 1989) has surveyed the subject admirably. Review of the papers from that symposium, as well as the advice given to EPA by its independent scientific advisory committee, CASAC (EPA 1988B, 1988C), makes quite clear that there are many unresolved questions about human exposure to and the possible health effects of acid aerosols. Until we have better information on those issues, I do not think that there is a justifiable scientific basis for concluding that acid aerosols at currrent ambient levels are adversely affecting the public health.

[105] For example, one witness claimed that "the combination of sulfate particles and other associated particles in the atmosphere certainly may cause severe health damage and death. Indeed, this exposure may cause approximately 50,000 premature deaths per year." April 1989 Hearing Record at 16 (1989) (statement of Bailus Walker, Past President, American Public Health Association).

[106] Ozkaynak and Spangler, p. 5 (where these investigators state that for 'the reasons described above, it is difficult to use the published air pollution epidemiology to quantify polluntant-specific, exposure-response coefficients for either the morbidity or mortality effects of airborne particles.")

(c) OTA inappropriately used sulfates as a surrogate for the entire pollution mix even though the available scientific evidence does not link sulfates at current ambient levels to any health effects; and

(d) OTA could not find a method for disentangling the effects of air pollution from all other factors that could influence health.

In fact, what OTA did amounted to little more that plotting on a simple two-dimensional chart a single mortality statistic and a single measure of acid aerosol exposure for each of a number of cities. The very weak statistical correlation—a correlation that would disappear when small variations in the specification of input were made—derived from the scatter of data on this chart was interpreted by OTA as a cause-and-effect relationship between mortaility and ambient levels of acid aerosols. Such an approach ignores any other factors (such as climate, the flue, occupational exposures to toxins, demographics, and personal health care parameters such as diet, smoking, and availability of medical service) that could have influenced mortality and could have been correlated with acid aerosol readings. In short, the OTA anlaysis is not reliable enough to serve as the basis for congressional action.

Another witness before this Committee sought to construct an elaborate house of cards from self-selected portions of the human clinical, toxicological, and epidemiological data.[107] While an interesting exercise in hypothesis generation, there is no data to substantiate the theories offered; and many experts present different views based on evidence. Most troubling about this exercise is that this witness acknowledged the weakness of his arguments [108] and then proceeded to make his case perhaps in hopes of misleading the members of the Committee into placing more confidence in his analysis than it was due.

---

[107] In his testimony, Dr. Lippmann asserted that:

> *The human health effects of major concern with respect to the inhalation of acidic aerosols are bronchospasm in asthmatics, and acute and chronic bronchitis in all exposed persons.*
>
> Studies [of the human clinical variety] at the University of Washington related to the provocation of bronchospasm show evidence for increased airway resistance in exercising mild to moderate asthmatics following sulfuric acid exposures for 30 minutes at rest and 10 minutes of exercise for adolescents at 68 or 100 $\mu g/m^3$. Similar effects were seen in adult exposures at the University of Rochester for 2 hours at 75 $\mu g/m^3$ while exercising, or for 16 minutes at 450 $\mu g/m^3$ while at rest . . . .

April 1989 Hearing Record at pp. 80–81 (1989) (statement of Morton Lippmann, Ph.D. Professor of Environmental Medicine, New York University Medical Center) (emphasis added). Dr. Lippmann's discussion of his views of the cumulative effects of acid aerosols before the Committee were better expressed elsewhere:

> Thus, various [toxicological] studies indicate that the acute effects are more closely related to cumulative daily exposure than to peak concentrations, and that an exposure limit for H_2SO_4 should be expressed as a multihour average rather than as a short-term concentration limit.

Lippmann, "Health Benefits from Controlling Exposures to Criteria Air Pollutants," at p. 112. (January 1, 1989) (prepared for Congressional Research Service Report No. 89–161 ENR). Referring back to his statement at page 81 before the Committee, Dr. Lippmann concluded his theory with a reference to the Harvard Six Cities Study.

[108] "Much of the exposure-response data base is suggestive, rather than conclusive . . . ." April 1989 Hearing Record at p. 80 (1989) (Statement of Morton Lippmann, Ph.D. Professor of Environmental Medicine, New York University Medical Center).

By contrast, Dr. Donald F. Proctor's testimony before the Committee was especially lucid [109] and relied on the careful evaluation of EPA's Issue Paper, which was supported by CASAC. The EPA, CASAC, and Proctor analyses provide a very different view from the one presented by Dr. Lippmann.

Certain of the statements made to the Committee regarding acid aerosols were especially disappointing in that they were unsupported and generalized claims.[110] These alarming claims do contain a faint hint of truth about the populations at risk and then focus extensively on the *potential* effects of pollutants, unnecessarily distorting the debate. While shocking in their appearance, these claims have no relevance to "real world" situations, lacking any tie to the concentrations of air pollutants that actually occur in the United States today. The Committee must be astute enough not to direct our scarce resources at such non-existent health threats, setting us on a course that will not produce tangible public health benefits.

(d) Acid Deposition and Drinking Water

One of the witnesses before the Committee addressed the potential effects of acid deposition on the levels of metal in drinking water:

> Acidified waters may dissolve such toxic metals as aluminum, copper, lead, and mercury. It can also release such toxic substances as asbestos from soil and rocks in watersheds, lakes, and drinking water distribution systems.
>
> Of particular concern is *lead* and *mercury*. Acidification of drinking water sources significantly increases lead content of our water supplies. Leaded water pipes become particularly hazardous as the pH decreases.
>
> * * * * *
>
> Mercury can also occur in several [chemical] species. Of concern here is the methyl-mercury, which has a tendency to bio-accumulate in nature and is dependent to some extent on acidification.[111]

These claims are merely speculation. Of the many characteristics of water quality that can influence water's ability to leach lead from soils or plumbing, acidity is one. By itself, however, acidity does not control the corrosivity of water. In addition, no relationship has been established between acid deposition and the corrosivity of water. Areas with low acid deposition can have drinking water with high corrosivity and lead levels and areas with high acid deposition can leave drinking water with low corrosivity and low lead levels. Thus, it is not clear that controlling acid deposition can have any influence on corrosivity or lead levels.

---

[109] April 1989 Hearing Record at pp. 141-149 (1989) (Statement of Dr. Donald F. Proctor, M.D.).

[110] For example, Dr. Walker offered the following comments:

> Public health studies have found an increase in lung cancer mortality in men and an increase in bronchitis in men and women who were exposed to sulfur dioxide.
>
> Sulfur dioxide aggravates existing conditions such as asthma and heart disease. During even brief exposures to sulfur dioxide, asthmatic individuals experience impeded movements of air in and out of the lungs.
>
> Sulfuric acid aerosols have a variety of adverse health effects including spasm of the larynx and of the lungs which cause death, depending upon the concentration and the individual sensitivity. Populations at special risk from particulate sulfates are the elderly and adults with pre-existing chronic heart and lung diseases.

April 1989 Hearing Record at p. 16 (statement of Bailus Walker, Past President, American Public Health Association).

[111] April 1989 Hearing Record at p. 16 (1989) (Statement of Bailus Walker, Past President, American Public Health Association).

Lead can enter drinking water from two sources. It can be leached from the soils or from plumbing. Research indicates that the leaching of lead from soil by rain water is not an important source of lead.[112] In addition, the lead leached from plumbing systems can readily be controlled by treatment for corrosivity at the water treatment plant—treatment which may well be needed even if the claims made to the committee prove absolutely false. Thus, while it is very important to reduce the human intake of lead, acid deposition regulation is not a functional method for achieving that goal.

Speculation is also offered about potential linkages between acid deposition and mercury uptake by the population. Research on mercury is controversial at best. Mercury levels in fish tissue can be either high in waters with low acidity, or low in waters with high acidity. This apparent lack of a correlation between acidity and mercury levels in fish tissue led NAPAP Director James Mahoney to project that current studies on mercury mobilization would likely reveal low risk, if any, from acid deposition.[113]

(e) Nitrogen Oxide

The discussion of NO_x by the witnesses before the Committee largely focused on the potential contributions of NO_x emissions to ozone concentrations. EPA has adopted ambient standards for both NO_x and ozone thus offering direct health protection from the effects of NO_x and indirect protection from whatever contribution NO_x emissions may make to ozone concentrations. The Agency periodically reviews the adequacy of the health protection that these standards provide and revises them as necessary.[114]

Having good standards on the books is not enough; attainment of standards is what is truly important. Essentially the entire country now attains the ambient standards for NO_x. Thus, the Committee cannot justify the nitrogen oxide provisions of the acid deposition title by any direct or indirect benefit to human health—certainly none that is not already achieved through EPA's continually reviewed NO_x ambient air quality standard.

Much of the country does not meet the ozone standard, however. To the degree that NO_x controls can help alleviate ozone, EPA should require such controls as part of State Implementation Plans for ozone. It should be noted however, that NO_x reductions are not always compatible with ozone reduction goals and may in fact hinder their attainment. Consequently, a national NO_x control program pursued independent of a local ozone plan may be counterproductive, making safe ozone levels more difficult and delaying the time at which they can be attained.

---

[112] "Studies by Sharpe (46) indicate that the concentration of lead in soil leachate, in areas of high atmospheric lead deposition, is well below the drinking water standard and that there is a higher concentrate of lead in water reaching the soil than in the soil leachate." Nordberg, Goyer, and Clarkson, "Impact of Effects of Acid Precipitation on Toxicity of Metals," 63, Environmental Health Perspective 169, 174 (1985).

[113] Memorandum to Richard G. Darman, Director, OMB from James R. Mahoney, Director, NAPAP, May 4, 1989, p. 10.

[114] EPA has recently begun to reconsider the ambient standard for NO_x and has the ozone standard under review.

The preceding discussion leads to the conclusion that a human health argument does not exist for the acid deposition program embodied in the Committee bill. Supporters of this program have tried to lay claim to myriad health benefits, but every such benefit either lacks scientific justification, or is already achieved or achievable through attainment of the standards issued pursuant to section 109 of the Clean Air Act.

B. THE COMMITTEE PROPOSAL

Title V of the Committee bill is an amalgam of the Administration's original acid rain proposal and the Baucus-Mitchell proposal. Its outstanding features are the imposition of an overall cap on SO_2 emissions, a 10 million ton reduction in SO_2 emissions, a 2 million ton reduction in NO_x emissions below 1980 levels (which is 4 million tons below projected year 2000 levels), a 3 phased reduction requirement, and the creation of an emissions trading program. Accepting for the moment the premises of its authors concerning the environmental justification for the title, there are serious policy problems associated with the title. Some of these are discussed below.

1. THE EMISSIONS CAP

Under title V, annual emissions of SO_2 will be held to an absolute ceiling of 8.9 million tons (or allowances). This cap is to be maintained, in part, through the creation of three categories of coal-fired generating plants. Plants currently emitting more than 1.2 pounds of SO_2 for every million Btu's of heat input would be required to hold allowances that are equivalent to a 1.2 pound level or lower, and would be prohibited from increasing their utilization (capacity factor) above their 1985–87 baseline unless they further reduce the plant's emissions. Plants emitting less than 1.2 pounds would have to continue operating at their 1985 emission rate times their baseline, which could be substantially lower than they would otherwise be allowed to emit. New plants would have to operate at a net zero emission level, which means companies would have to reduce, or offset, emissions at other plants in an amount equal to the new plant's emissions.

These caps on emission levels and utilization will discourage economic growth in a number of ways. First, the use of all types of coal as a source of energy will be prohibitively expensive due to the cost of compliance with these legislative restrictions. The capacity factor-emission level cap, which is intended to remain constant, may even make the future use of clean coal facilities prohibitively expensive, and thus negate the effect of billions of dollars spent on clean coal technology research and development.

The restriction on coal use will further raise utilities' costs by decreasing fuel options. Utilities should be able to choose from a variety of fuels to provide energy and economic security while not forcing reliance on a single fuel. Past regulation of the nuclear energy industry has crippled its potential, at least for the present. If we overregulate the use of coal by the utility industry, we further diminish the Nation's ability to keep energy costs down. Thus, the course being set is one that will lead to higher costs for utilities and, ultimately, for all businesses and consumers.

In addition, due to capacity caps, coal plants already in operation, which provide nearly 60 percent of today's electricity needs, may be prohibited from operating at full capacity, since the cap is based on an average of the Btu's burned in 1985 through 1987, during which time newer plants may not have been operating anywhere near peak capacity. As utilities replace that lost, or "banned" capacity, they will have to pass their costs on to consumers of all kinds, increasing, of course, the cost of goods and services throughout a State, and hurting small businesses and families with low or fixed incomes.

The cost of further reducing emissions in older plants to compensate for new plant emissions will discourage utilities from building new coal-fired plants. This period of sluggish utility growth could have a negative impact on the availability of electricity for economically expanding states. Stifling growth is clearly not in the Nation's interest, and hopefully the Senate will agree as it considers the bill that the Environment and Public Works Committee has produced.

2. COMPLIANCE DEADLINES

In so-called Phase I of the Committee title, all utility powerplants emitting at a rate of more than 2.5 pounds of sulfur dioxide per million Btu will have to reduce emissions to a level equal to 2.5 lbs./mmBtu multiplied by their average 1985 through 1987 fuel consumption measured in Btu. This category includes some 107 utility sources in eighteen eastern states. In so-called Phase II of the title, all utility powerplants above 75 MW emitting at a rate of more than 1.2 lbs./mmBtu will have to reduce emissions to a level equal to 1.2 lbs./mmBtu multiplied by their average 1985 through 1987 fuel consumption measured in Btu. The provisions of the Administration's bill dealing with the timing of compliance with these phased-in emissions required compliance by December 31, 1995 for Phase I and by December 31, 2000 for Phase II. The Committee bill rejects the Administration's approach by commencing Phase I reductions on January 1, 1995 and Phase II reductions on January 1, 2000.

The NAPAP interim report showed, however, that we have time to act deliberately in addressing the acid rain problem. We should take advantage of that time. In that regard, the Administration's bill simply offered utilities a more realistic set of compliance deadlines. It is a matter of fact that shortening compliance dates, even by one year, will increase costs, increase the difficulty of long-range utility planning and affect the development and demonstration of clean coal technologies. Finally, the Committee approach probably underestimates the time that EPA will need to formulate regulations, that utilities will need to develop compliance plans, and that EPA will need to review and approve those plans. In short, when it comes to changes of the magnitude that this title would require, the Administration's bill provided a more reasonable timetable.

3. NO_x REDUCTIONS

The Committee title differs from the Administration's approach by requiring the reduction of nitrogen oxides emissions, if possible, by four million tons, even in the absence of credible scientific or operating data for doing so. In other words, the Committee title would double the required NO_x reduction sought by the Administration's bill. Based, in particular, on concerns about the ability of western utilities to meet these goals in a cost efficient manner, it is probable that (1) the Administration was right in the first place about the necessary amount of NO_x reductions, (2) the technology for attaining a 4 million ton NO_x reduction is not well-developed or widely available, and (3) the high costs of obtaining a 4 million ton NO_x reduction will be significantly more costly than the Administration's goal and should be taken into account.

In fact, in testimony, the Administration requested a two million ton NO_x reduction below projected levels for the year 2000 because it believed that there is little scientific guidance on what is the appropriate level of NO_x reduction. And while some take the view that more reductions are always better than less, atmospheric chemistry is not that simple and more reductions result in even higher costs. In areas of high ambient ozone levels, decreases in NO_x, in many instances, may result in an increase in ozone. The Administration's plan selected two million tons in NO_x reductions as the appropriate level for dealing with NO_x as a contributor to both acid deposition and ozone. Without the scientific basis to demonstrate that the EPA was wrong to strike the balance where it did, the Committee should have at least accepted the Administration's proposal; particularly, given the fact that the control technologies for NO_x are not as cost effective as those that exist for SO_2 control.

Low NO_x burners can be an effective control technology on certain types of boilers ($150 to $200/ton of NO_x removed). However, for many boilers, the only available technological option to get significant reductions is selective catalytic reduction ("SCR") which is extremely costly, about the same installed cost as SO_2 scrubbing but significantly more expensive in terms of cost per ton removed ($1,500 to $2,000 per ton of NO_x removed). There are also real uncertainties about SCR design and performance when applied to American coals. What is worse is that SCR may result in the formation of hazardous wastes from ammonia injections and the use of metal catalysts. These substances, in fact, are hazardous air pollutants under other provisions of the Committee's bill.

4. INNOVATIVE TECHNOLOGIES

States that both produce and use large quantities of coal should be particularly concerned about the limited role that clean coal technologies play in the acid rain proposal the Committee has approved.[115] Without changes, this proposal will slow or halt development of new clean coal technologies. It would do this either by forcing utilities to divert billions of dollars away from technology development to pay for the cost of installing conventional scrubber technologies or by limiting the timing and scope of compliance extensions for companies that wish to install clean coal technologies.

The Committee proposal would de facto limit the use of coal, our most abundant domestic energy resource. Only companies that implement one of five specific, repowering clean coal technologies listed in the title will be given an additional four years to reach their emission goals. The Committee proposal does take a step in the right direction by acknowledging the potential of certain clean coal technologies, but, in the end, it ignores a large number of clean coal technologies which are equally, if not more, promising than the five arbitrarily singled out by the title. This restricted emphasis on five technologies, coupled with the limited incentive of a four year extension to implement them, could put an end to the progress being made in developing and applying clean coal technologies.

The government-industry clean coal technology program is yielding promising results, and not only in the five repowering clean coal technologies specifically encouraged by the title. In fact, several clean coal technologies promise to achieve the same results as flue-gas desulfurization, or scrubbing, at a much lower cost. Because of the time required to engineer and install any clean coal technology, utilities will have as alternatives only those technologies that have been developed and adequately demonstrated by the mid-1990's, a mere five years or so from the time this bill is likely to be enacted into law.

These limits on the application of clean coal technologies would come well before we realize even a portion of the benefits from the public *and* private sector investment in those technologies. Since 1985, Congress has appropriated $2.747 billion for the clean coal program. When that sum is combined with those invested by private entities, DOE estimates that a total of $6.25 billion will be spent on clean coal demonstration projects during the life of the program. To abandon these programs now or to fail to take full advantage of their results would be foolish and wasteful.

Therefore, at the very least, the title should have provided utilities with more flexibility as to how they reduce emissions and encouraged them to continue to invest in clean coal technologies. If the Senate provides that flexibility, utilities and their customers may be able to avoid the excessive cost of installing scrubbers and the quality of the Nation's air will still be improved dramatically. To achieve this end, compliance dates should be extended from four to five years for utilities seeking to use clean coal technology and the list of qualifying technologies should be expanded. Obviously, this one year extension simply would allow time for the maturing of additional clean coal technologies. In exchange for that brief delay, the coal industry as a whole, utilities that use coal, and electricity consumers would benefit.

---

[115] For an excellent and in-depth presentation of the issues outlined here, see, written testimony of the Clean Coal Technology Coalition, submitted to the Subcommittee on Environmental Protection, October 3, 1989.

5. EMISSIONS TRADING

The Committee adopted elements of the Administration's proposal that would create a program of allowance trading. Obviously, the purpose of these provisions is to encourage free market solutions to the allocation of SO_2 emissions. The Committee bill does create a permitting program that gives utilities emission "allowances," but the bill imposes an array of restrictions on how those allowances can be used or traded. In part, it does this by giving the Administrator authority to develop an entire allowance trading system, including the right to determine how, when, and why allowances can be traded. To work, such a program would have to be returned to the Administration's approach where free market forces, rather than the EPA Administrator, govern this process.

For example, under the bill, an allowance cannot be traded until it is first officially recorded by the Administrator. If the Administrator chooses not to record a transaction or there is an administrative delay, the transaction may fail. This transaction-by-transaction approach to regulation is analogous to a bank asking to approve every check written before it is used to pay anyone. Instead of adopting an unwieldy approach to allowance trading, the title should have been fashioned to promote reliance upon other provisions of the title that require EPA to monitor a utility's aggregate emissions transactions. In other words, just as the bank provides a periodic statement and levies penalties to discourage from overdrawing, the EPA could perform an annual reconciliation or produce a statement of utility trades. EPA will also be able to impose penalties for failure to comply with emissions limits. With the benefit of this reconciliation and the threat of noncompliance fines, utilities would have every opportunity and incentive to ensure that allowances are traded properly and promptly so that they stay in compliance. In short, the bill should have separated the permitting program from allowance trading.

The title also undermines the very concept of allowance trading by stating that allowances do not constitute a property right and by confiscating each year 2 percent of any utility's allowances. These provisions mean that those who create excess allowances by voluntarily overcontrolling SO_2 emissions, involuntarily and with what may not be adequate compensation, will have to turn over two percent of them to the EPA and will face the risk of further confiscation with no compensation. At very least, this also means that EPA would have free rein to limit, revoke, transfer, or otherwise modify utilities' allowances. Since overcontrol is a voluntary action, giving EPA this power has a number of inevitable results.

First, utilities are less likely to create allowances if they are subject to the risk of having those remaining allowances appropriated by EPA. Nonetheless, even if utilities were willing to take such a risk, the ratepayers and stockholders who ultimately pay for overcontrol—which is more expensive than mere compliance—are probably not willing to accept that risk. Second, there are also serious questions about the propriety of allowing EPA to confiscate, perhaps without just compensation, allowances for which a utility's ratepayers and stockholders have paid. Third, public service commissions and environmental agencies are not likely to permit utilities to overcontrol their emissions if the benefits of that locally financed overcontrol are subject to EPA appropriation. Finally, if, despite all else, a utility does attempt to create excess allowances, it probably will have a difficult time getting financing for such an overcontrol project. The utility will have to tell potential investors that EPA will seize some, and perhaps all, of the allowances created by the project. The best way to ensure that allowances are traded is not to permit EPA to confiscate them but to let the free market work in the fashion envisioned by the President. If some utilities have allowances and others need them, free market forces will work to create ready quantities of allowances.

6. PLANTS UNDER CONSTRUCTION

The Committee bill runs the risk of inadvertently harming utilities that have made long range plans under existing law. Building a powerplant, by its very nature, takes a long time and is the result of years of planning. For instance, plants currently under construction were planned perhaps ten years ago, so while they are designed to comply with stringent new source performance standards, operators of these plants have not and could not have foreseen the need to meet an emissions cap like that proposed in this bill.

A number of plants across the country that will soon be complete are designed to meet the most stringent environmental standards to date, yet the Committee bill would ask them to reduce emissions further or to obtain SO_2 offsets. Given that these utilities began construction on the basis of the current then Clean Air Act, it is unfair to require them now to make costly and disruptive construction changes to comply with a new law. The title should have clarified that power plants under construction at the time of enactment are not "new units" and are thus not subject to the associated requirements found in title V.

C. THE COST OF THE COMMITTEE BILL

The many problems discussed above pale in comparison to the one overriding problem with the bill that should concern members of the Senate from any State or region—it is a brutally expensive bill. While, of course, there has been no time for government agencies or private parties to analyze the cost impacts of the Committee substitute, analyses done with respect to similar proposals provide some indication of what the Nation can expect to pay for this new acid rain policy. The provisions of the Administration's bill, which are far less onerous in terms of NO_x reductions, provide a rough guide for the cost of the Committee's proposal. Under the Administration's proposal, the estimated electric utility acid deposition rain costs range from $3 billion to $8 billion per year based on estimates generated by Temple, Barker & Sloane ("TBS") for the Edison Electric Institute[116] and by ICF Resources and Pechan Associates for EPA.[117] Taking as a reasonable estimate the high end of the ICF range and the low end of the TBA range, and again ignoring the stricter NO_x provisions of the Committee bill, a cost of $5 billion annually is possible. A national cost of $5 billion would mean that some 16 States would confront costs in excess of $100,000,000 a year. The ripple effect of such costs on the economy—particularly on manufacturing concerns—is not difficult to imagine. In addition, without change, the air toxics portion of the Committee bill could also affect utility costs dramatically. Some have predicted a near tripling of compliance costs if utilities must also control for toxic air pollutants pursuant to the Committee bill.

These very rough cost estimates simply illustrate the fact that there is a pressing need for the Congressional Budget Office, the Congressional Research Service, the Office of Technology Assessment, and the EPA to undertake immediately a review of the costs of the Committee proposal. Numbers of the order of magnitude applicable to acid rain proposals should not be left to guess work. Before full Senate action is taken on this, or for that matter any provisions of the bill, a full cost analysis must be completed and reviewed. To act without conclusive cost findings would be an unpardonable breach of the Senate's obligation to protect and promote the national welfare.

In the face of scientific uncertainies weighed against exorbitantly high costs, one need not be opposed to new acid rain control legislation to support a "go slow" approach to taking up the Committee-passed bill on the Senate Floor. To the contrary, those who favor improving the quality of the Nation's air through additional reductions in emissions of sulfur dioxide and nitrogen oxides should have a strong interest in ensuring that this legislation is both workable and regionally balanced. The speed with which this legislation has moved and, apparently, will move gives a few in the Senate the opportunity to make such a determination. (See Excerpt # 2). For that reason, all Senators should support efforts to assess the full economic consequences of this title. In the period that it takes to prepare those estimates, much can be determined generally about the efficacy and wisdom of the bill the Committee has produced.

---

[116] *Economic Evaluation of H.R. 3030/S. 1490 "Clean Air Act Amendments of 1989" Title V, The Acid Rain Control Program*, Temple, Barker & Sloane, Inc., Prepared for The Edison Electric Institute, August 30, 1989.

[117] *Economic Analysis of Title V (Acid Rain Provisions) of the Administration's Proposed Clean Air Act Amendments (H.R. 3030/S. 1490)*, Prepared for the U.S. Environmental Protection Agency, ICF Resources Inc., September, 1989.

THE WALL STREET JOURNAL FRIDAY, DECEMBER 15, 1989

Excerpt # 2

Hermetically Sealed Law

"Keep going, keep going." That's what Senator Max Baucus was urging last month as the Senate environment committee marked up its clean air bill. The result is a testament to the modern legislative process.

In one day, the committee considered at least 40 amendments. Senator Baucus unveiled his acid rain provision and had it passed unanimously within hours. Smog, ozone, acid rain, permits and enforcement, greenhouse, toxics—the committee rammed it all through, almost without debate. Amid the chaos, something got lost—parts of the bill itself.

Different parts of the scrawled bill were spread out on the desks of different staffers. The staff couldn't retrieve all the pages in time for the final vote, so the committee ended up passing a major bill with key pages missing.

Business groups were frantic, wondering if their firms were getting gored. They still can't get a look at the bill. The committee staff hasn't finished writing it.

The contentious acid rain issue will no doubt be settled in some back room with Senator Byrd running interference for West Virginia's coal miners. But how did it get out of the committee so easily? There are no Senators from the big midwestern states on the panel. There *are* six Senators from Western states that could face severe compliance costs. The answer: Four of those Senators—Burdick, Baucus, Durenberger and Simpson—got special exemptions for their states, leaving most of the country to fend for itself with the burden. Senator Symms of Idaho was the only member of the panel who fought the rush to passage; his state got no special treatment.

The gale force wind behind this effort is Senate Majority Leader George Mitchell. For 12 years he has been pushing for a clean air bill. It looks as if he's figured out a way to get it: blow over everything in his path, including serious hearings, science, economic analysis, even regional politics. Senator Mitchell promises that it will be the first bill the Senate votes on when it reconvenes in January. At least 31 Senators have asked the three congressional research arms to evaluate 100 specific effects of the bill, but the researchers will be able to produce only cursory results by the time Mr. Mitchell wants to put it up for full vote.

Of course some interests will be well served by Senator Mitchell's work. The EPA bureaucrats are especially interested in the permits and enforcement section of the bill. Mr. Mitchell's bill layers an entire new permit-issuing bureaucracy on top of the one that already exists. Not only would businesses have to get an EPA approval for new construction, a permit would be required simply to operate. As the bill stands, every gas station, dry cleaner, body shop or any other chemical-emitting business would have to hold public hearings and get a permit to stay in business.

The EPA, which has represented its own interests more than those of the White House recently, loves the permitting section. EPA's bureaucracy would swell, paid for by emissions taxes. EPA permit officers would have the power to shut down small businesses; they could revoke permits at any time. The EPA would even have the power to overrule state environmental offices, a blunt repudiation of federalism. And the penalties for businessmen would be tough: up to $250,000 per individual and 15 years in jail if their company releases a hazardous air pollutant that places people in imminent danger. The distinction between malicious pollution and unintentional pollution also is eroded.

The U.S. already spends $33 billion a year on clean air, more per capita than any of our trading partners. The President's bill would add at least $25 billion to that. The Senate package is off the meter, and could double the costs of the existing act.

At the risk of intruding crude reality into the Senate's sealed world, there are real firms out there in America, with real employees, trying to compete. If Senator Mitchell is going to throttle entire industries, maybe it would be nice to have a bill that has withstood the scrutiny of an interested public, rather than being railroaded through a Senate whose members will barely understand the law on which they are voting.

V. AIR TOXICS

Of all the current Clean Air Act programs revamped and revised by the Committee bill, the one most in need of such revision is section 112, the establishment of national emission standards for hazardous air pollutants.

That is not to say that the American public currently remains unprotected from air toxics. Progress in dealing with air toxics should be viewed in a much broader context than just regulation under section 112 of the Clean Air Act. EPA has set in motion a large number of Federal regulatory activities under section 112 and other sections of the Clean Air Act (as well as other EPA legislative authorities), pollutant and source assessments, State and local program development activities, and technical assistance projects which are already beginning to show tangible results in terms of a better understanding of what the problem is (and is not), possible solutions, and actual emission reductions.

A. THE FAILURE OF SECTION 112

Nevertheless, as means of addressing the health concerns associated with millions of localized emissions of air toxics around the country, section 112 has proved to be unworkable. Partially at fault has been the continual litigation that has forced the Agency to revisit standards again and again, affording little time to promulgate new standards. Perhaps the litigation that has most confounded EPA regulators was *Natural Resources Defense Council, Inc.* v. *EPA* (D.C. Cir. July 28, 1987), known as the *Vinyl Chloride* case.

Vinyl Chloride should not have created the confusion it did. In plain terms, the court's decision laid out what appears to be a reasoned and acceptable view of Congressional intent. The decision breaks regulations under section 112 into two parts, one based only on an objective evaluation of the risk and not taking costs or feasibility into consideration, and a second step, factoring in these latter items in an attempt to achieve a level of the most acceptable risk possible. The Court was merely describing what the scientific community had been demanding for some time—a more clearly defined separation between risk assessment and risk management.

This, of course, would mean that risk management decisions to purposefully "overestimate a risk *so as to be safe*" would not longer be acceptable. Instead, a risk managers would have to deal with actual risks, using margins of safety "*so as to be safe.*"

Unfortunately, the simplicity of this approach was lost on EPA. Instead, the Agency has hung steadfastly to its historic risk assessment process, choosing to implement *Vinyl Chloride*'s two tiered process by making the first step conveniently vague, and then using "second step" considerations to reach a more defined policy decision.

B. THE COMMITTEE'S PROPOSED SOLUTION

In an effort to extract the Agency from this hopelessly futile regulatory scheme, the Committee bill would initiate a new approach to hazardous air pollutant regulation—technological standards imposed without regard to whether they are actually necessary in order to protect human health. However, mindful of the fact that such standards may, by their very arbitrary nature, not adequately protect human health, the bill adds an additional round of regulation whose goal is to achieve a level of homogeneous cancer risk of no greater than one in a million for the most exposed individuals in our society.

It would probably surprise the average American to find out that Congress is no longer concerned about saving lives as much as it is worried about ensuring "homogeneouos risk." Such a goal is never advanced overtly by the proponents of the Committee bill. Almost all public arguments in favor of the bill talk about "cancer cases avoided," lives saved," or "deaths avoided." And yet, the pursuit of these goals would involve a regulatory program substantially different from the one proposed in the Committee bill.

But, even if you accept the attaining of homogeneous risk as the end goal of this legislation, there are serious concerns about how effectively the Committee bill would address even that objective. Among the concerns of greatest import are the following:

1. LIST OF POLLUTANTS

(a) Compound Categories

The substances to be regulated under section 112 are supposed to be those for which the EPA has at least some evidence that health risks are present. Yet, the Committee bill includes 174 specific compounds, including 17 categories of substances, such a cobalt compounds and manganese compounds. Each of these categories represents an addition of many individual substances. In most cases, there is no evidence to suggest that every member of a category causes any human health effect. Instead of identifying which substances may cause human health effects, the bill unfairly shifts the burden of proof to manufacturers and users of these substances.

SARA Title III contains provisions for delisting substances similar to the proposed Section 112 criteria. To date, the Agency has processed only 18 delisting petitions. This is of particular concern since these 17 categories *include at least 1000 individual substances.*

In addition to problems with delisting individual substances, the inclusion of these categories will significantly increase the difficulty of identifying source categories for regulation. Whether the Agency could ever identify every source category of each of these substances is questionable, but given the relatively tight schedules in the bill it would appear impossible.

(b) Ammonia

By including ammonia on its list of routine hazardous air pollutants, the Committee places an unfair double regulatory burden on the fertilizer industry. Ammonia, the basic nitrogen enhancer in nature as well as on the farm, is specifically listed under both the routine emissions and the sudden and accidental release provisions of the bill. And yet, the principal health concern with ammonia is strictly its sudden and accidental release into the atmosphere.

Ammonia is not carcinogenic, mutagenic, teratagenic, or neurotoxic, in either low or high volumes of exposure, nor does it present any significant public health hazard or environmental hazard through chronic exposure to routine emissions.

The imposition of costly and burdensome regulation on routine ammonia emissions associated with the production of crop nutrients would place an undue economic burden on an already beleaguered farm economy. If air emissions of ammonia are hazardous at all, it is only in the case of substantial, sudden and accidental release, the regulation of which is appropriately addressed under accident prevention provisions.

In fact, far greater quantities of ammonia are released into the ambient air by the natural decomposition of organic material, including manure. The World Health Organization in 1986 estimated that cattle manure alone in the United States released 370,000 tons of ammonia per year. According to EPA in 1987, livestock waste management systems for beef cattle feedlots and cropland spreading resulted in a release of 540,000 tons of ammonia per year into the atmosphere. This is far above the emissions associated with commercial fertilizers.

Even the human body produces ammonia—almost 16 grams per day. The human system, through the urea cycle, breaks down and converts that ammonia and can tolerate substantial additional quantities of exposure with no harmful effect.

Half of all nitrogen fertilizer used by farmers is applied in the form of anhydrous ammonia, or simply, ammonia without water. Farmers prefer anhydrous ammonia because it is 82 percent nitrogen, while most other nitrogen enhancers are only 40 percent nitrogen, costing more to obtain the same amount of nutrient.

America's farmers have learned to live with and handle ammonia safely. The agricultural sector's hazardous substance training and educational programs associated with ammonia are among the best in the nation. It simply does not make sense to impose additional cost, uncertainty and burden on the nation's food production sector by including ammonia fertilizer under both the routine and accidental section of the toxics title.

2. VOLUNTARY EMISSIONS REDUCTION

The Committee bill does attempt to recognize the value of offering carrots as well as sticks to obtain emissions reductions. There are a number of inequities in the Committee's provision, however.

First, the voluntary emissions reductions given recognition in the bill are only those achieved before 1992, from a base emission level established as that emitted in a *calendar year no earlier than 1985.* Examine this scenario: Company A made a significant investment in major pollution control equipment in late 1984. His competition, Company B, thought he might get by without any pollution control. The Committee bill is enacted. Company B, realizing his loafing days are over, sees he can get a 90 percent reduction by using the same technology that Company A installed in 1984. RESULT: Company A must now retool to meet a "maximum achievable control technology" (MACT) standard in 1992, while Company B is exempted.

This scenario is the direct result of applying the voluntary reductions credits to reductions *from a particular date.* No matter what date you select, it will be inequitable for those who acted just previous to that date. This inequity can be avoided by calculating the reductions from an industry norm, or from a "generally available control technology" equivalent, and then crediting reductions that go beyond that level, regardless of the time period in which the reductions occurred.

The Committee bill also implies that voluntary emissions reductions apply only to a single source category or subcategory within a major facility. Companies should have the option of aggregating the reductions of all listed pollutants at a given site to achieve the overall 90 percent emissions reduction. This provides a realistic incentive for companies to make the investment in early reductions because it gives them the flexibility to find the most cost-effective emissions to reduce.

The definition of "voluntary" is also problematic, resulting in certain good faith efforts not being eligible toward the 90 percent tally. For example, several States or local agencies "confiscate" reductions which have been made in VOCs at the time they redo their inventories for SIPs. As written, the Committee bill would preclude the use of such reductions obtained, since provisions to incorporate past reductions in SIPs are part of some state's and local agency's regulations. Many emission reductions in nonattainment areas would not be allowed. The same language would also complicate the process for counting emissions reductions—the bill doesn't give any guidance on that matter. As a matter of consistency, since the goal of the voluntary emission reduction credit is to obtain emissions reductions early, how or why those reductions occurred should not be a question of any bearing on whether the reductions are credited.

3. UTILITY POWERPLANT EMISSIONS

Even though utility powerplants are the focus of significant regulation under other titles, and even though utility plant emissions have seldom been measured for quantification or for health effects, the Committee bill does not fail to impose one more layer of potentially costly regulation on these sources.

Utility plant emissions listed under the air toxics title fall into three categories: solids found in the fugitive flyash portion of the flue gas (like manganese and nickel), gases vaporized by the high temperature flue gases (like hydrocholoric acid) and other compounds that are not certain to be found in flue gas (like polycyclic organics).

Because the utility powerplant is already under significant regulation, options for further reductions are limited. Particulates from powerplants are currently regulated on a measurement of opacity performance and emission rates. In order to achieve a nominal 20 percent opacity limit, an implied collection efficiency often exceeds 99 percent. Even with this efficient performance, fugitive emission may total over threshold limits. The technology needed to improve upon this high level of performance is limited to one known method: fabric filtration or baghouses which would have to be retrofit to existing units at enormous cost.

The President, in his Clean Air proposal, wisely incorporated a thorough scientific review of the possible health benefit from utility powerplant regulation for air toxics prior to the imposition of any regulations. Such a provision would be a prudent and justified addition to the Committee bill.

4. ADDITIONAL REGULATION OF CARCINOGENS

The Committee bill would treat equally all known, probable, or possible carcinogens. Under the Agency's categorization scheme, this would include substances for which there is no evidence of human carcinogenicity. Those substances should not be treated the same as substances for which there is strong evidence of human carcinogenicity.

Such substances trigger the "risk standards" of a "one-in-10,000" and a "one-in-a-million" lifetime cancer risk. The EPA estimates that such standards are not currently technologically feasible for a number of major U.S. industries.[118] Charts 10 and 11 list those industries most likely to "have difficulty" meeting such standards.

---

[118] "Analysis of Cost of Hazardous Air Pollutant Controls [draft]," prepared by Energy and Environmental Analysis, Inc. for submission to the U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, October 27, 1989, pp. 5-16 to 5-19.

Chart #10

EXAMPLES OF SOURCE CATEGORIES THAT MAY HAVE DIFFICULTY IN MEETING A 1 IN 10,000 RISK STANDARD[1/]

Category	Chemical(s) Emitted
Butadiene Production	Butadiene
Neoprene Production	Butadiene
Polybutadiene Production	Butadiene
Styrene, Butadiene Resins	Butadiene
Chlorinated Hydrocarbon Use	Chloroform, Carbon Tetrachloride, Methylene Chloride
Chlorinated Hydrocarbon Production	Chloroform, Carbon Tetrachloride, Methylene Chloride
Pharmaceuticals	Chloroform, Methylene Chloride
Ethylene Dichloride Production	Ethylene Dichloride
Pesticide Production	Ethylene Dichloride, Carbon Tetrachloride, Methylene Chloride
Ethylene Oxide Production	Ethylene Oxide
Primary Copper Smelters	Arsenic
Primary Lead Smelters	Arsenic
Zinc Oxide Production	Arsenic
Chemicals Production	Chromium
Ferrochrome Production	Chromium
Vinylidiene Chloride Polymer	Vinylidiene Chloride
Coke Ovens	Benzene Soluble Organics

1/ Source categories listed were assumed to have a current risk greater than 1 in 1,000, thus requiring emissions reductions of more than 90 percent to achieve a 1 in 10,000 residual risk.

Chart #11

EXAMPLES OF SOURCE CATEGORIES THAT MAY HAVE DIFFICULTY IN MEETING A 1 IN 1,000,000 RISK STANDARD[1/]

Category	Chemical(s) Emitted
Chlorine Production	Carbon Tetrachloride
Ethylene Dichloride Production	Chloroform, Ethylene Dichloride
Arsenic Chemical Production	Arsenic
Secondary Lead Smelters	Arsenic
Specialty Steel Production	Arsenic
Glass Manufacturing	Arsenic
Chromium Production	Chromium
Refractories	Chromium
Coke Byproducts Processing	Benzene
Mill Tailings Piles	Radionuclides (Radon)
Elemental Phosphorous Plants	Radionuclides
Underground Uranium Mines	Radionuclides

1/ Source categories listed were assumed to have a current risk greater than 1 in 10,000, thus requiring emissions reductions of more than 99 percent to achieve a 1 in 1,000,000 risk.

Because the consequences of failure to meet standards applied under this section are so severe (i.e. shutdown), it is unreasonable to ignore the consideration of technological feasibility in the development of standards, and yet such considerations are specifically prohibited in the bill.

5. ACCIDENTAL RELEASE PROVISIONS

The accidental release provisions of the Committee Bill are intended to prevent the sudden accidental release of "extremely hazardous substances" in concentrations "that may reasonably be anticipated to cause acute [short-term] adverse health effects in humans," and to minimize the consequences of such releases.

Subsection (c) of this section directs the EPA Administrator to propose and, after public comment, promulgate a list of no less than 50 of such extremely hazardous substances within two years of enactment. The primary source for candidate substances is the list of more than 400 substances under the emergency planning provision (section 302) of the Emergency Planning and Community Right-to-Know Act of 1986 (title III of the SARA). it further provides that this new list shall include substances "with the greatest likelihood to cause death, injury, property damage, or evacuation as the result of sudden, accidental release." Clearly the accidental release provisions are intended to apply to a subset of chemicals considered "extremely hazardous."

Despite the explicit instructions regarding the selection of substances, the Committee then inserts on its own part an initial list of 25 substances to be subject to the accidental release provisions, eleven substances that are *not* included on the SARA Section 302 "reference" list, and do *not* appear to meet the specified criteria. Some of these chemicals—acetone, methyl ethyl keton, methylene chloride, tetrachlorethylene, and toluene—are widely used throughout American industry, and have not been implicated in the Bhopal-like incidents that the emergency release provisions are designed to address.

The permissible exposure limits, or PELs, specified by the Occupational Safety and Health Administration (OSHA) as acceptable workplace exposure limits (8-hour and 15-minute averages) for these 11 substances are considerably higher than levels generaly recommended for substances presenting significant acute health hazards. There is a similar distinction in the recommended threshold limit values (TLVs) developed by the American Conference of Governmental Industrial Hygienists (ACGIH) for these substances.

The 11 substances appear to have been selected, not on the basis of their potential acute toxicity, but on the magnitude of atmospheric emissions of these substances reported under the provisions of section 313 of SARA. Such emissions have no relation to the acute toxicity of a chemical, nor to its potential for sudden, accidental release.

Moreover, emissions of these substances will be substantially reduced through the imposition of technology-based and, if necessary, health-based emission controls specified under other provisions of this title.

Listing of individual substances in this section circumvents the procedures for EPA assessment and prioritization (including the opportunity for public comment) established by the bill itself, and will *not* facilitate more rapid implementation of the accidental release provisions for substances so listed. Such a list should not be included in this title, and should, in any event, be limited to substances that fit the specified criteria for selection as "extremely hazardous."

VI. STRATOSPHERIC OZONE (CFC) AND GREENHOUSE PROVISIONS

As reported, the Committee bill contains the text of an amendment similar to that which was reported by the Committee earlier this year in connection with the Budget Reconciliation. The amendment provides for a unilateral phase-out by the United States of chlorofluorocarbons (CFCs), halons, and carbon tetrachloride, without regard to the outcome of international negotiations now underway to strengthen and expand the Montreal Protocol on Substances that Deplete the Ozone Layer. This amendment, unwarranted on its own merits, is of particular concern since its has now been inappropriately added to the debate on reauthorization of the Clean Air Act.

The cumbersome regulatory program contained in Title VI has not been carefully reviewed. It was reported as part of the Committee's reconiliation without extensive public input, and was subsequently stricken from the reconciliation bill. it should similarly be stricken from the Clean Air amendments.

Unilateral legislative action by the United States on these chemicals would put U.S. industry at a competitive disadvantage compared to foreign companies using CFCs that would be under no comparable restriction (for example, the Japanese electronics industry). This, in turn, would undoubtedly cost U.S. jobs.

Moreover, unilateral legislative action could frustrate international negotiations to strengthen the Montreal Protocol by tying the hands of the U.S. negotiating team. The folly of unilateral action in this regard is illustrated by the CFC aerosol ban enacted by Congress in the 1970s. Because the European nations imposed no comparable restrictions, they now enjoy a bargaining advantage over the United States by virtue of their ability to offer easy short-term reductions in CFC aerosol use.

A. HCFC AND METHYL CHLOROFORM

A section of the amendment that would impose limits on hydrochlorofluorocarbons (HCFCs) and methyl chloroform is being developed and is expected to be offered as an amendment on the Senate floor. Enactment of any provision limiting these substances could very well hinder our ability to achieve a more rapid phase-down of CFCs, by restricting the only alternatives to CFCs in a wide variety of uses.

The HCFCs and methyl chloroform are the only alternatives to CFCs in many applications. They have ozone depleting characteristics that are only a fraction of those of the CFCs. Methyl chloroform is also a raw material for some of the HCFCs. Over 100 users commented to EPA, in response to an advance notice of proposed rulemaking, that they need methyl chloroform and have no replacement available for the foreseeable future.[119] More recently, these points were underscored by user company representatives on EPA's Stratospheric Ozone Protection Advisory Council.[120]

Methyl chloroform is used for metal and precision cleaning in the electronics, aerospace, and automotive industries for civilian and defense applications. It can replace CFC–113 (one of the most difficult CFCs to replace) in many of these applications. While other materials and processes are available for some of these applications, many important products still must be cleaned using one or the other of these solvents. In these cases, use of methyl chloroform results in a 6- to 8-fold reduction of potential ozone depletion.

Methyl chloroform is the most environmentally acceptable substance currently available for most of its applications. It is not a hydrocarbon that contributes to the formation of ozone, and it is virtually nonflammable. None of the alternatives has been tested for health effects as thoroughly as methyl chloroform. Some have shown evidence of carcinogenicity in animal tests. Many more have not been tested at all.

Many of the alternatives contribute directly to ozone formation, and therefore may not be used in many parts of the United States where smog is a serious problem. Indeed, discouraging use of methyl chloroform would work at cross-purposes to the nonattainment provisions of the bill.

Many alternative substances are flammable or explosive, and thus may not be used where local fire codes prevent use of flammable materials. Even where they can be used, they may contribute to needless fire deaths and increased insurance costs.

Alternative water-based cleaning systems may be available for some applications. Yet they require much greater amounts of energy, mostly for heating and drying, than does solvent cleaning. Increased use of these water-based systems would lead to increased use of fossil fuels for energy, in turn contributing to the build-up of greenhouse gases.

The Committee amendment equates ozone depleting chemicals with greenhouse gases, and states that it will address global climate change resulting from the greenhouse effect as well as ozone layer destruction. In this regard, it should be noted that the HCFCs have far less "greenhouse" effect than CFCs, and that methyl chloroform has virtually no effect at all.

A recent paper by the two National Aeronautics and Space Administration scientists concludes that continued use of methyl chloroform at current levels until 2030 will not cause an increase in peak atmospheric chlorine concentrations over what would otherwise be the case if CFC, halon, and carbon tetrachloride emissions are phased out in 2000.[121] Such continued use of methyl chloroform also will not impede our ability to reduce atmospheric chlorine to 2 parts per billion, volume bases (ppbv) (the level of atmospheric chlorine prior to appearance of the Antarctic ozone hole) by 2070. Achieving this level is, as a practical matter, determined by the phase-out of the long-lived CFCs, halons, and carbon tetrachloride, not by intermediate controls on methyl chloroform and the HCFCs.

---

[119] 54 Fed. Reg. 15228 (April 17, 1989).

[120] Transcript, Meeting of the Stratospheric Ozone Protection Advisory Council, October 26, 1989, pp. 102–23.

[121] Prather, Michael J., and Watson, Robert T., *Transient Scenarios for Atmospheric Chlorine and Bromine,* undated manuscript provided as Annex 2 to Scientific Assessment of Stratospheric Chlorine, presented in Nairobi, Kenya in August 1989.

It is generally recognized that the ongoing international negotiations will result next year in an expanded Montreal Protocol that will phase out CFC emissions by 2000, and will freeze methyl chloroform emissions at current levels. The expanded Protocol is likely to become part of the U.S. law at that time. There is no reason for the U.S. Congress to be considering unnecessary legislation that at best would duplicate the expanded Montreal Protocol, and at worst could hinder the ability of the United States to phase out CFC use and subject U.S. companies to production controls and regulations more stringent than those imposed on companies operating in other nations.

B. CARBON TETRACHLORIDE

A general phase-out of carbon tetrachloride, which is not currently covered by the Montreal Protocol, would also pose problems for a segment of domestic industry. Some producers of chloroform use a process that results in production of relatively small amounts of carbon tetrachloride as by-product. Chloroform is a raw material for HCFC-22 (and possibly for other HCFCs) needed to replace CFCs. A blanket prohibition on carbon tetrachloride would severely disadvantage such producers, and could hamper development of the HCFCs needed to reduce society's dependence on CFCs.

C. RECYCLING

Among the amendments many regulations is a new mandate to recover CFCs from the waste stream effective January 1, 1992, and a prohibition on venting of CFCs to the atmosphere. Criminal penalties could apply for failure to meet these mandates.

Some CFC-containing consumer products, such as appliances and automobiles, enter the waste stream on their way to recyclers. Prudent environmental management would encourage more of such recycling. However, because methods for recyclers to recover and capture CFCs as a gas from refrigerators and air conditioners are limited, the cost of such could stifle or curtail recycling of several items. Furthermore, there are currently no methods available to recover CFCs from foam. CFC-containing foam can be found in insulation and in car seats which recyclers must remove and handle in order to reclaim the metal content of cars and appliances.

If it is illegal to vent CFCs from foam into the atmosphere, and there is no way to remove them from foam, then most recyclers will simply not handle materials containing the foam and people will have to remove car seats or other materials prior to having them taken away. The general populace, of course, is even less prepared to deal with the removed foam, and will likely store it or even dispose of it illegally, with the CFCs escaping in either case.

Needless to say, the net effect will be to discourage recycling for absolutely no CFC containment benefit whatsoever.

VII. PERMITS

Perhaps the most fundamental problem with the permit title of the bill is that it ignores the basic apparatus of the Clean Air Act, the state implementation plan (SIP), in favor of an entirely new bureaucratic program of individual permits which duplicate the function of the SIP that is left in place, albeit in a secondary role. The permit program, which surfaced and was proposed for inclusion in the bill within hours of final disposition by the Committee, never received serious scrutiny. No member of the Committee, and certainly no advisory agency to Congress, had the time to assess the economic implications of this feature of the bill on small businesses, the industrial sector, or state and federal regulatory agencies.

Because of this lack of scrutiny, there are several critical questions about the permit program that remained unanswered. For example, the permit program establishes a system very similar to that currently contained in the Clean Water Act. And yet the Clean Water Act contains an explicit clarification that certain permitting processes are the functional equivalent of the kind of environmental review required by the National Environmental Policy Act (NEPA), and therefore, NEPA review is not necessary for those permits. Absent such clarification for permits under the Clean Air Act, couldn't a court find need for environmental impact statements accompanying certain air permits? If this somehow became the case, the permit program in the bill would become catastrophically complicated and unworkable.

Even when taken on its own, the stunning feature of this permit program is its sheer enormity—requiring operating permits for virtually all stationary sources of air emissions. Unlike the current SIP system which implements and then enforces emissions requirements and technological controls across a broad array of sources, the bill will now require at least 50,000 businesses to have permits in place before they can operate. Many of these businesses could have in the dozens of permits. Each time one of these businesses wants to change a process, replace a solvent, use a different raw material, or even increase output to take advantage of production capabilities in a plant or to respond to a sudden upturn in consumer demand, it will have to get a permit revision. Some states have estimated that they would need to triple their current staffs just to administer such a program.

It is inconceivable that efficiency analysis of such a permit program would show it to be the best use of administration resources or company resources, or even of significant benefit to this country in terms of accomplishing our clean air goals. Furthermore, it seems quite clear that the bureaucracy responsible for processing these permits will not be able to capably handle permit revision and issuance without putting the nation's industry in an operational strait jacket.

VIII. ENFORCEMENT

The bill greatly enlarges enforcement authorities under the Clean Air Act. This, in combination with a myriad of new control requirements, compliance schedule deadlines, record-keeping and reporting obligations, and statements under oath (sworn certifications) in other parts of the bill should raise some concerns about the potential for imposing staggering penalties on those who are attempting to comply in good faith.

It has been claimed that this title reflects the enforcement provisions incorporated in the Clean Water Act Amendments enacted in 1987. Water and air, however, are immensely different media. Because of the ease of containing, channeling and centrally processing water, regulated entities under the water act are functionally operating within plant-wide "bubbles." Air, however, cannot be so easily funneled into one regulated waste stream. Consequently, air permits must account for numerous specific emissions sources within a single plant. Enforcement of Clear Water Act NPDES requirements are therefore much less complicated than what would be involved in any similar enforcement strategy for air sources.

The enforcement title attempts to free the Department of Justice and the Environmental Protection Agency from proving in every case in every court every fact and every minute that a company violated the law. But it tries to achieve this by reversing the rules of evidence. The attempt obviously backfires into a bewildering combination of shortcuts in evidentiary proof, lack of administrative and judicial due process, and enormous criminal and civil sanctions.

While there is a need to "get tough" in enforcing environmental laws, the provisions now in the bill are a counter-incentive to responsible management—coming down hard on the few skilled and knowledgeable managers who have the stamina and ability to work in the field of environmental engineering. First, the bill eliminates procedural due process for those who are alleged to have violated the law, and second, it imposes heavy criminal penalties on responsibile environmental managers for violations of any number of technically complex and burdensome reporting and record-keeping requirements. The opportunity for good-faith errors is substantial.

Under such circumstances, it is hard to believe that these enforcement provisions would promote attainment of our clean air goals, and indeed, it is possible that, given the discretionary limitations of the plain language of the law, they might be implemented in a manner that is actually counterproductive to those goals. In truth, this Committee has agreed to amendments that could send good environmental managers to jail—and that would be a travesty. The Clean Air Act should only punish those persons who willfully violate the law, and what the committee bill does goes far beyond that objective.

STEVE SYMMS.

CHANGES IN EXISTING LAW

In compliance with section 12 of rule XXVI of the Standing Rules of the Senate, changes in exsting law made by the bill as reported are shown as follows: Existing law to be omitted is enclosed in black brackets; new language is printed in italic; and existing law to which there is no change is shown in roman.

THE CLEAN AIR ACT

TITLE I—AIR POLLUTION PREVENTION AND CONTROL

PART A—AIR QUALITY AND EMISSION LIMITATIONS

FINDINGS AND PURPOSES

* * * * * * *

INTERSTATE AIR QUALITY AGENCIES OR COMMISSIONS

SEC. 106. For the purpose of developing implementation plans for any interstate air quality control region designated pursuant to section 107 *or of implementing section 186 (relating to control of interstate ozone air pollution)*, the Administrator is authorized to pay, for two years, up to 100 per centum of the air quality planning program costs of *any commission established under section 186 (relating to control of interstate ozone air pollution) or* any agency designated by the Governors of the affected States, which agency shall be capable of recommending to the Governors plans for implementation of national primary and secondary ambient air quality standards and shall include representation from the States and appropriate political subdivisions within the air quality control region. After the initial two-year period the Administrator is authorized to make grants to such agency *or such commission* in an amount up to three-fourths of the air quality planning program costs of such agency *or such commission*.

AIR QUALITY CONTROL REGIONS

SEC. 107. (a) * * *

* * * * * * *

(c)*(1)* The Administrator shall, within 90 days after the date of enactment of the Clean Air Amendments of 1970, after consultation with appropriate State and local authorities, designate as an air quality control region any interstate area or major intrastate area which he deems necessary or appropriate for the attainment and maintenance of ambient air quality standards. The Administrator shall immediately notify the Governors of the affected States of any designation made under this subsection.

(2) If an area is designated nonattainment with respect to ozone and is located within a metropolitan statistical area or a consolidated metropolitan statistical area (as defined by the Office of Management and Budget), the boundaries of such area are hereby revised by operation of law to include the entire metropolitan statistical area or consolidated metropolitan statistical area, as the case may be. Such boundary revision shall apply for purposes of any State implementation plan revision required to be submitted by any State after enactment of this paragraph. If a State demonstrates to the satisfaction of the Administrator within sixty days of such designation that with respect to a portion of a metropolitan statistical area or consolidated metropolitan statistical area,

(A) sources in that portion do not contribute to violations of the standards, and

(B) there is a geographical basis for excluding that portion, the Administrator may approve a State's request to exclude such portion from the nonattainment area. The Administrator shall determine whether or not to exclude such portion within sixty days of receiving the State's request.

(3) In the case of any area which is designated as a nonattainment area for carbon monoxide and is classified as serious pursuant to section 187(a) or this section, the Administrator may, after consultation with the State in which such area is located, modify the boundaries of the area by rule to include the entire metropolitan statistical area or consolidated metropolitan statistical area, as the case may be, if the Administrator determines that such modification is necessary to attain the carbon monoxide air quality standard. Such boundary revision shall apply for purposes of any State implementation plan revision required to be submitted by the State after such modification.

(d)(1) * * *

* * * * * * *

[(5) A State may from time to time review, and as appropriate revise and resubmit, the list required under this subsection. The Administrator shall consider and promulgate such revised list in accordance with this subsection.]

(5)(A) Based on a request for area redesignation by the Governor of any State, or at any time on the Administrator's own motion, the Administrator may revise the designation of any area or portion of an area in accordance with this section and part D.

(B) Whenever the Administrator obtains evidence demonstrating that an area exceeds a national ambient air quality standard for any pollutant and is not designated as a nonattainment area for such pollutant pursuant to this section, the Administrator shall, within ninety days of receiving such evidence, propose, and within one hundred and eighty days promulgate by rule, a revised designation of such area as nonattainment for such pollutant, and where applicable, a classification of such area in accordance with part D.

(C) The Administrator may redesignate a nonattainment area to atttainment only if—

(i) the Administrator promulgates the redesignation by rule, after notice and opportunity for comment;

(ii) the Administrator determines that the area has attained the national ambient air quality standard;

(iii) the Administrator has fully approved the applicable implementation plan;

(iv) the Administrator determines that the improvement in air quality is due to permanent reduction in emissions;

(v) the Administrator has fully approved a maintenance plan for the area as meeting the applicable requirements of section 110 and part D; and

(vi) the State containing such area has met all requirements applicable to the area under section 110 and part D.

(D) the Administrator shall not redesignate any area from nonattainment to unclassifiable.

* * * * * * *

(f)(1) Upon promulgation of a new or revised national ambient air quality standard, the Administrator shall designate as attainment, nonattainment, or unclassifiable all areas of the country pursuant to this subsection as expeditiously as practicable, but in no case later than six months from the date of promulgation of the new or revised standard. Such period may be extended for specific areas for up to six additional months in the event the Administrator has, after making reasonable efforts to obtain the relevant information, insufficient information to make the designations. The Administrator shall designate as—

(A) nonattainment, any area that does not meet (or contributes to ambient air quality in a nearby area that does not meet) the new or revised national ambient air quality standard for the pollutant;

(B) attainment, any area (other than an area identified in subparagraph (A)) that meets the new or revised national ambient air quality standard for the pollutant;

(C) unclassifiable, any area that cannot be classified on the basis of available information as having met the new or revised national ambient air quality standard for the pollutant.

(2) A designation for an area made pursuant to this subsection shall remain in effect until the Administrator redesignates the area.

(3) Each area which, as of the last calendar year before the date of enactment of this subsection for which data is available, did not meet the national primary ambient air quality standard for ozone or such standard for carbon monoxide averaged over an eight-hour period, is hereby designated by operation of law as nonattainment.

(4) Until redesignation by the Administrator, each area which—

(A) is identified in 52 Federal Register 29383 (August 7, 1987) as a Group I area, or

(B) contains a site for which air quality monitoring data shows a violation of the national ambient air quality standard for PM–10 before the date of enactment of this subsection,

is hereby designated by operation of law nonattainment for PM–10. All other areas of the country not described in subparagraph (A) or (B) are designated unclassifiable for PM–10, until such time as the Administrator redesignates any such area. Any designation for par-

ticulate matter (measured in terms of total suspended particulates) which the Administrator promulgated pursuant to section 107(d), as in effect before the date of enactment of this subsection, shall remain in effect for purposes of implementing the maximum allowable increases in concentrations of particulate matter (measured in terms of total suspended particulates) pursuant to section 163(d), until the Administrator determines that such designation is no longer necessary for such purpose.

AIR QUALITY CRITERIA AND CONTROL TECHNIQUES

SEC. 108. (a)(1) * * *

* * * * * * *

[(e) The Administrator shall, after consultation with the Secretary of Transportation and the Secretary of Housing and Urban Development and State and local officials and within 180 days after the enactment of this subsection, and from time to time thereafter, publish guidelines on the basic program elements for the planning process assisted under section 175 of part D.]

(e) The Administrator shall, after consultation with the Secretary of Transportation and with State and local officials, within nine months after enactment of the Clean Air Act Amendments of 1989 and periodically thereafter as necessary to maintain a continuous transportation-air quality planning process, update the June 1978 Transportation-Air Quality Planning Guidelines and publish guidance on the development and implementation of transportation and other measures necessary to demonstrate and maintain attainment of national ambient air quality standards. Such guidelines shall include information on—

(1) methods to identify and evaluate alternative planning and control activities;

(2) methods of reviewing plans on a regular basis as conditions change or new information is presented;

(3) identification of funds and other resources necessary to implement the plan, including interagency agreements on providing such funds and resources;

(4) methods to assure participation by the public in all phases of the planning process; and

(5) such other methods as the Administrator determines necessary to carry out a continuous planning process.

[(f)(1) The Administrator shall publish and make available to appropriate Federal agencies, State, and air pollution control agencies, including agencies assisted under section 175 within 6 months after enactment of this subsection for clauses (i), (ii), (iii), and (iv) of subparagraph (A) and within one year after the enactment of this subsection for the balance of this subsection (and from time to time thereafter).

[(A) information, prepared, as appropriate, in cooperation with the Secretary of Transportation, regarding processes, procedures, and methods to reduce or control each such pollutant, including but not limited to—

[(i) motor vehicle emission inspection and maintenance programs;

[(ii) programs to control vapor emissions from fuel transfer and storage operations and operations using solvents;

[(iii) programs for improved public transit;

[(iv) programs to establish exclusive bus and carpool lanes and areawide carpool programs;

[(v) programs to limit portions of road surfaces or certain sections of the metropolitan areas to the use of common carriers, both as to time and place;

[(vi) programs for long-range transit improvements involving new transportation policies and transportation facilities or major changes in existing facilities;

[(vii) programs to control on-street parking;

[(viii) programs to construct new parking facilities and operate existing parking facilities for the purpose of park and ride lots and fringe parking;

[(ix) programs to limit portions of road surfaces or certain sections of the metropolitan area to the use of nonmotorized vehicles or pedestrian use, both as to time and place;

[(x) provisions for employer participation in programs to encourage carpooling, vanpooling, mass transit, bicycling, and walking;

[(xi) programs for secure bicycle storage facilities and other facilities, including bicycle lanes, for the convenience and protection of bicyclists, in both public and private areas;

[(xii) programs of staggered hours of work;

[(xiii) programs to institute road user charges, tolls, or differential rates to discourage single occupancy automobile trips;

[(xiv) programs to control extended idling of vehicles;

[(xv) programs to reduce emissions by improvements in traffic flow;

[(xvi) programs for the conversion of fleet vehicles to cleaner engines or fuels, or to otherwise control fleet vehicle operations;

[(xvii) programs for retrofit of emission devices or controls on vehicles and engines, other than light duty vehicles, not subject to regulations under section 202 of title II of this Act; and

[(xviii) programs to reduce motor vehicle emissions which are caused by extreme cold start conditions;]

(f)(1) The Administrator shall publish and make available to appropriate Federal, State, and local environmental and transportation agencies not later than one year after enactment of the Clean Air Act Amendments of 1989, and from time to time thereafter—

(A) information prepared, as appropriate, in consultation with the Secretary of Transportation, regarding the formulation and emission reduction potential of transportation control measures related to carbon monoxide, ozone precursors, particulate matter and toxic air pollutants, including, but not limited to—

(i) programs for improved public transit;

(ii) restriction of certain roads or lanes to, or construction of such roads or lanes for use by, passenger buses or high occupancy vehicles;

(iii) employer-based transportation management plans;

(iv) trip-reduction ordinances;

(v) traffic flow improvement programs that achieve emission reductions;

(vi) fringe and transportation corridor parking facilities serving multiple occupancy vehicle programs or transit service;

(vii) programs to limit or restrict vehicle use in downtown areas or other areas of emission concentration particularly during periods of peak use, through road use charges, tolls, parking surcharges, or other pricing mechanisms, vehicle restricted zones or periods, or vehicle registration programs;

(viii) programs for the provision of all forms of high-occupancy, shared-ride services;

(ix) transportation management plans for shopping centers;

(x) programs to limit portions of road surfaces or certain sections of the metropolitan area to the use of non-motorized vehicles or pedestrian use, both as to time and place;

(xi) programs for secure bicycle storage facilities and other facilities, including bicycle lanes, for the convenience and protection of bicyclists, in both public and private areas;

(xii) programs to control extended idling of vehicles;

(xiii) programs for the conversion of fleet vehicles to cleaner engines or fuels, or to otherwise control fleet vehicle operations; and

(xiv) programs to reduce motor vehicle emissions which are caused by extreme cold start conditions.

* * * * * * *

(g) GUIDELINES FOR ENHANCED MONITORING AND INVENTORIES.—Not later than six months after enactment of this subsection, the Administrator shall publish the following:

(1) guidelines for enhanced monitoring by the State or local air pollution control agencies of emissions of pollutants (or precursors thereof) for which there is a national ambient air quality standard established under section 109, including guidelines governing the frequency, location, and maintenance of monitors; and

(2) guidelines for improving the inventories of emissions from mobile and stationary sources (including, but not limited to, emissions factors for estimating emissions from stationary sources which emit less than twenty-five tons per year and other area sources) of pollutants (or precursors thereof) for which there is a national ambient air quality standard established under section 109.

Failure by the Administrator to publish guidelines required under paragraphs (1) and (2) shall not affect other applicable deadlines *under this Act, including, but not limited to requirements under section 110 or part D.*

*　*　*　*　*　*　*

IMPLEMENTATION PLANS

SEC. 110. (a) [(1)] Each State shall, after reasonable notice and public hearings, adopt and submit to the Administrator, within [nine] *twenty-four* months after the promulgation of a national primary ambient air quality standard (or any revision thereof) under section 109 for any air pollutant, a plan which provides for implementation, maintenance, and enforcement of such primary standard in each air quality control region (or portion thereof) within such State. In addition, such State shall adopt and submit to the Administrator (either as a part of a plan submitted under the preceding sentence or separately) within [nine] *twenty-four* months after the promulgation of a national ambient air quality secondary standard (or revision thereof), a plan which provides for implementation, maintenance, and enforcement of such secondary standard in each air quality control region (or portion thereof) within such State. Unless a separate public hearing is provided, each State shall consider its plan implementing such secondary standard at the hearing required by the first sentence of this paragraph.

[(2) The Administrator shall, within four months after the date required for submission of a plan under paragraph (1), approve or disapprove such plan for each portion thereof. The Administrator shall approve such plan, or any portion thereof, if he determines that it was adopted after reasonable notice and hearing and that—

[(A) except as may be provided in subparagraph (I)(i) in the case of a plan implementing a national primary ambient air quality standard, it provides for the attainment of such primary standard as expeditiously as practicable but (subject to subsection (e)) in no case later than three years from the date of approval of such plan (or any revision thereof to take account of a revised primary standard); and (ii) in the case of a plan implementing a national secondary ambient air quality standard, it specifies a reasonable time at which such secondary standard will be attained;

[(B) it includes emission limitations, schedules, and timetables for compliance with such limitations, and such other measures as may be necessary to insure attainment and maintenance of such primary or secondary standard, including, but not limited to transportation controls, air quality maintenance plans, and preconstruction review of direct sources of air pollution as provided in subparagraph (D);

[(C) it includes provision for establishment and operation of appropriate devices, methods, systems, and procedures necessary to (i) monitor, compile, and analyze data on ambient air quality and, (ii) upon request, make such data available to the Administrator;

[(D) it includes a program to provide for the enforcement of emission limitations and regulation of the modification, construction, and operation of any stationary source, including a permit program as required in parts C and D and a permit or equivalent program for any major emitting facility, within such region as necessary to assure (i) that national ambient air quality standards are achieved and maintained, and (ii) a procedure, meeting the requirements of paragraph (4), for review (prior to construction or modification) of the location of new sources to which a standard of performance will apply;

[(E) it contains adequate provisions (i) prohibiting any stationary source within the State from emitting any air pollutant in amounts which will (I) prevent attainment or maintenance by any other State of any such national primary or secondary ambient air quality standard, or (II) interfere with measures required to be included in the applicable implementation plan for any other State under part C to prevent significant deterioration of air quality or to protect visibility, and (ii) insuring compliance with the requirements of section 126, relating to interstate pollution abatement;

[(F) it provides (i) necessary assurances that the State will have adequate personnel, funding, and authority to carry out such implementation plan, (ii) requirements for installation of equipment by owners or operators of stationary sources to monitor emissions from such sources, (iii) for periodic reports on the nature and amounts of such emissions; (iv) that such reports shall be correlated by the State agency with any emission limitations or standards established pursuant to this Act, which reports shall be available at reasonable times for public inspection; (v) for authority comparable to that in section 303, and adequate contingency plans to implement such authority; and (vi) requirements that the State comply with the requirements respecting State boards under section 128;

[(G) it provides, to the extent necessary and practicable, for periodic inspection and testing of motor vehicles to enforce compliance with applicable emission standards;

[(H) it provides for revision, after public hearing, of such plan (i) from time to time as may be necessary to take account of revisions of such national primary or secondary ambient air quality standard or the availability of improved or more expeditious methods of achieving such primary or secondary standard; or (ii) except as provided in paragraph (3)(C), whenever the Administrator finds on the basis of information available to him that the plan is substantially inadequate to achieve the national ambient air quality primary or secondary standard which it implements or to otherwise comply with any additional requirements established under the Clean Air Act Amendments of 1977;

[(I) it provides that after June 30, 1979, no major stationary source shall be constructed or modified in any nonattainment area (as defined in section 171 (2)) to which such plan applies, if the emissions from such facility will cause or contribute to concentrations of any pollutant for which a national ambient air quality standard is exceeded in such area, unless, as of the time of application for a permit for such construction or modification, such plan meets the requirements of part D (relating to nonattainment areas);

[(J) it meets the requirements of section 121 (relating to consultation), section 127 (relating to public notification), part C (relating to prevention of significant deterioration of air quality and visability protection); and

[(K) it requires the owner or operator of each major stationary source to pay to the permitting authority as a condition of any permit required under this Act a fee sufficient to cover—

[(i) the reasonable costs of reviewing and acting upon any application for such a permit, and

[(ii) if the owner or operator receives a permit for such source, whether before or after the date of enactment of this subparagraph, the reasonable costs (incurred after such date of enactment) of implementing and enforcing the terms and conditions of any such permit (not including any court costs or other costs associated with any enforcemnent action).

[(3)(A) The Administrator shall approve revision of any implementation plan applicable to an air quality control region if he determines that it meets the requirements of paragraph (2) and has been adopted by the State after reasonable notice and public hearings.]

* * * * * * *

[(b) The Administator may, wherever he determines necessary, extend the period for submission of any plan or portion thereof which implements a national secondary ambient air-quality standard for a period not to exceed eighteen months from the date otherwise required for submission of such plan.]

(b) MAINTENANCE PLANS.—

(1) Whenever an area containing all or part of a metropolitan statistical area or consolidated metropolitan statistical area is designated attainment or unclassifiable with respect to a national ambient air quality standard, the Administrator shall, and in other cases may, require the State containing such area to submit an implementation plan (including such emissions inventories as the Administrator may prescribe) that provides for maintenance of such standard for at least twenty years from the date such plan is submitted. Every ten years after submission of the last twenty-year maintenance plan, the State shall submit an updated twenty-year maintenance plan.

(2) Any plan required to be submitted pursuant to paragraph (1) shall meet the applicable requirements of subsection (c) (concerning general plan requirements).

(3) Any plan required to be submitted pursuant to paragraph (1) shall be submitted by the State in accordance with such schedules as the Administrator may reasonably prescribe.

[(c)(1) The Administrator shall, after consideration of any State hearing record, prompty prepare and publish proposed regulations setting forth an implementation plan, or portion thereof, for a State if—

[(A) the State fails to submit an implementation plan which meets, the requirements of this section, [(B) the plan, or any portion thereof, submitted for such State is determined by the Administrator not to be in accordance with the requirements of this section, or

[(C) the State, fails, within 60 days after notification by the Administrator or such longer period as he may prescribe, to revise an implementation plan as required pursuant to a provision of its plan referred to in subsection (a)(2)(H).

If such State held no public hearing associated with respect to such plan (or revision thereof), the Administrator shall provide opportunity for such hearing within such State on any proposed regulation. The Administrator shall, within six months after the date required for submission of such plan (or revision thereof), promulgate any such regulations unless, prior to such promulgation, such State has adopted and submitted a plan (or revision) which the Administrator determines to be in accordance with the requirements of this section. Notwithstanding the preceding sentence, any portion of a plan relating to any measure described in the first sentence of section 121 (relating to consultation) or the consultation process required under such section 121 shall not be required to be promulgated before the date eight months after such date required for submission.

[(2)(A) The Administrator shall conduct a study and shall submit a report to the Committee on Interstate and Foreign Commerce of the United States House of Representatives and the Committee on Public Works of the United States Senate not later than three months after date of enactment of this paragraph on the necessity of parking surcharge, management of parking supply, and preferential bus/carpool lane regulations as part of the applicable implementation plans required under this section to achieve and maintain national primary ambient air quality standards. The study shall include an assessment of the economic impact of such regulations, consideration of alternative means of reducing total vehicle miles traveled, and an assessment of the impact of such regulations on other Federal and State programs dealing with energy or transportation. In the course of such study, the Administrator shall consult with other Federal officials including, but not limited to, the Secretary of Transportation, the Federal Energy Administrator, and the Chairman of the Council on Environmental Quality.

[(B) No parking surcharge regulation may be required by the Administrator under paragraph (1) of this subsection as a part of an applicable implementation plan. All parking surcharge regulations previously required by the Administrator shall be void upon the date of enactment of this subparagraph. This subparagraph shall not prevent the Administrator from approving parking surcharges if they are adopted and submitted by a State as part of an applicable implementation plan. The Administrator may not condition approval of any implementation plan submitted by a State on such plan's including a parking surcharge regulation.

[(C) The Administrator is authorized to suspend until January 1, 1975, the effective date or applicability of any regulations for the management of parking supply or any requirement that such regulations be a part of an applicable implementation plan approved or promulgated under this section. The exercise of the authority under this subparagraph shall not prevent the Administrator from approving such regulations if they are adopted and submitted by a State as part of an applicable implementation plan. If the Administrator exercises the authority under this subparagraph, regulations requiring a review or analysis of the impact of proposed parking facilities before construction which take effect on or after January 1, 1975, shall not apply to parking facilities on which construction has been initiated before January 1, 1975.

[(D) For purposes of this paragraph—

[(i) The term "parking surcharge regulation" means a regulation imposing or requiring the imposition of any tax, surcharge, fee, or other charge on parking spaces, or any other area used for the temporary storage of motor vehicles.

[(ii) The term "management of parking supply" shall include any requirement providing that any new facility containing a given number of parking spaces shall receive a permit or other prior approval, issuance of which is to be conditioned on air quality considerations.

[(iii) The term "preferential bus/carpool lane" shall include any requirement for the setting aside of one or more lanes of a street or highway on a permanent or temporary basis for the exclusive use of buses or carpools, or both.

[(E) No standard, plan, or requirement, relating to management of parking supply or preferential bus/carpool lanes shall be promulgated after the date of enactment of this paragraph by the Administrator pursuant to this section, unless such promulgation has been subjected to a least one public hearing which has been held in the area affected and for which reasonable notice has been given in such area. If substantial changes are made following public hearings, one or more additional hearings shall be held in such area after such notice.]

* * * * * * *

[(4) In the case of any applicable implementation plan containing measures requiring—

[(A) retrofits on other than commercially owned in-use vehicles,

[(B) gas rationing which the Administrator finds would have seriously disruptive and widespread economic or social effects, or

[(C) the reduction of the supply of on-street parking spaces,

the Governor of the State may, after notice and opportunity for public hearing, temporarily suspend such measures notwithstanding the requirements of this section until January 1, 1979, or the date on which a plan revision under section 110(a)(2)(I) is submitted, whichever is earlier. No such suspension shall be granted unless the State agree to prepare, adopt, and submit such plan revision as determined by the Administrator.

[(5) (A) Any measure in an applicable implementation plan which requires a toll or other charge for the use of a bridge located entirely within one city shall be eliminated from such plan by the Administrator upon application by the Governor of the State, which application shall include a certification by the Governor that he will revise such plan in accordance with subparagraph (B).

[(B) In the case of any applicable implementation plan with respect to which a measure has been eliminated under subparagraph (A), such plan shall, not later than one year after the date of the enactment of this subparagraph, be revised to include comprehensive measures (including the written evidence required by part D), to:

[(i) establish, expand, or improve public transportation measures to meet basic transportation needs, as expeditiously as is practicable; and

[(ii) implement transportation control measures necessary to attain and maintain national ambient air quality standards,

and such revised plan shall, for the purpose of implementing such comprehensive public transportation measures, include requirements to use (insofar as is necessary) Federal grants, State or local funds, or any combination of such grants and funds as may be consistent with the terms of the legislation providing such grants and funds. Such measure shall, as a substitute for the tolls or charges eliminated under subparagrah (A), provide for emissions reductions equivalent to the reductions which may reasonably be expected to be achieved through the use of the tolls or charges eliminated.

[(C) Any revision of any implementation plan for purposes of meeting the requirements of subparagraph (B) shall be submitted in coordination with any plan revision required under part D.]

(c) GENERAL REQUIREMENTS FOR IMPLEMENTATION PLAN SUBMITTALS.—Each implementation plan submitted by a State under this Act shall be adopted by the State after reasonable notice and public hearing. Each such plan shall—

(1) include enforceable emission limitations and other control measures, means, or techniques as well as schedules and timetables for compliance, as may be necessary or appropriate to meet the applicable requirements of this Act;

(2) provide for establishment and operation of appropriate devices, methods, systems, and procedures necessary to—

(A) monitor, compile, and analyze data on ambient air quality, and

(B) upon request, make such data available to the Administrator;

(3) include a program to provide for the enforcement of the measures described in paragraph (1), and regulation of the modification and construction of any stationary source within the areas covered by the plan as necessary to assure that national ambient air quality standards are achieved and maintained, including a permit program as required in parts C and D;

(4) contain adequate provisions—

(A) prohibiting any source or other type of emissions activity within the State from emitting any air pollutant in amounts which will—

(i) contribute significantly to nonattainment in or interfere with maintenance by, any other State with respect to any such national primary or secondary ambient air quality standard,

(ii) interfere with measures required to be included in the applicable implementation plan for any other

State under part C to prevent significant deterioration of air quality or to protect visibility, or

(iii) contribute to atmospheric loadings of pollutants or their transformation products which may reasonably be anticipated to cause or contribute to an adverse effect on public health or welfare or the environment in any other State,

(B) insuring compliance with the applicable requirements of sections 126 and 115 (relating to interstate and international pollution abatement);

(5) provide—

(A) necessary assurances that the State (or, except where the Administrator deems inappropriate, the general purpose local government or governments, or a regional agency designated by the State or general purpose local governments for such purpose) will have adequate personnel, funding, and authority under State (and, as appropriate, local) law to carry out such implementation plan (and is not prohibited by any provision of Federal or State law from carrying out such implementation plan or portion thereof), including a statement from the attorney general (or the attorney for those relevant State (or, as appropriate, local) air pollution control agencies which have independent legal counsel) that the laws of such State (or locality) provide adequate authority to carry out such implementation plan,

(B) requirements that the State comply with the requirements respecting State boards under section 128, and

(C) necessary assurances that, where the State has relied on a local or regional government, agency, or instrumentality for the implementation of any plan provision, the State has responsibility for ensuring adequate implementation of such plan provisions;

(6) require, as may be prescribed by the Administrator—

(A) the installation, maintenance, and replacement of equipment, and the implementation of other necessary steps, by owners or operators of stationary sources to monitor emissions from such sources,

(B) periodic reports on the nature and amounts of emissions and emissions-related data from such sources, and

(C) correlation of such reports by the State agency with any emission limitations or standards established pursuant to this Act, which reports shall be available at reasonable times for public inspection;

(7) provide for authority comparable to that in section 303 and adequate contingency plans to implement such authority;

(8) provide for revision of such plan—

(A) from time to time as may be necessary to take account of revisions of such national primary or secondary ambient air quality standard or the availability of improved or more expeditious methods of attaining such standard, and

(B) except as provided in section 110(h)(2), whenever the Administrator finds on the basis of information available to him that the plan is substantially inadequate to attain the national ambient air quality standard which it imple-

ments or to otherwise comply with any additional requirements established under this Act;

(9) in the case of a plan or plan revision for an area designated as nonattainment under section 107, meet the applicable requirements of part D (relating to nonattainment areas);

(10) meet the applicable requirements of section 121 (relating to consultation), section 127 (relating to public notification), and part C (relating to prevention of significant deterioration of air quality and visibility protection);

(11) provide for—

(A) the performance of such air quality modeling as the Administrator may prescribe for the purpose of predicting the effect on ambient air quality of any emissions of any air pollutant for which the Administrator has established a national ambient air quality standard, and

(B) the submission, upon request, of data related to such air quality modeling to the Administrator;

(12) require the owner or operator of each major stationary source to pay to the permitting authority, as a condition of any permit required under this Act, a fee sufficient to cover—

(A) the reasonable costs of reviewing and acting upon any application for such a permit, and

(B) if the owner or operator receives a permit for such source, the reasonable costs of implementing and enforcing the terms and conditions of any such permit (not including any court costs or other costs associated with any enforcement action).

[(d) For purposes of this Act, an applicable implementation plan is the implementation plan, or most recent revision thereof, which has been approved under subsection (a) or promulgated under subsection (c) and which implements the requirements of this section.]

(d) ENVIRONMENTAL PROTECTION AGENCY ACTION ON PLAN SUBMISSIONS.—

(1)(A) The Administrator shall promulgate minimum criteria that any plan submission must meet before the Administrator is required to act on such submission under this subsection.

(B) Within sixty days of the Administrator's receipt of a plan or plan revision, but no later than six months after the date by which a State is required to submit the plan or revision, the Administrator shall determine whether each part of the plan or revision meets the minimum criteria established pursuant to subparagraph (A). Any plan or plan revision that a State submits to the Administrator, and that has not been determined by the Administrator (by the date six calendar months after receipt of the submission) to have failed to meet the minimum criteria established pursuant to subparagraph (A), shall on that date be deemed by operation of law to meet such minimum criteria.

(C) Where the Administrator determines that a plan submission (or part thereof) does not meet the minimum criteria established pursuant to subparagraph (A), the State shall be treated as not having made the submission (or, in the Administrator's discretion, part thereof).

(2) Within twelve months of a determination by the Administrator (or a determination deemed by operation of law) under paragraph (1) that a State has submitted a plan or plan revision (or, in the Administrator's discretion, part thereof) that meets the minimum criteria established pursuant to paragraph (1), the Administrator shall act on the submission in accordance with paragraph (3).

(3) In the case of any submittal on which the Administrator is required to act under paragraph (2), the Administrator shall—

(A) approve such submittal as a whole if it meets all of the applicable requirements of this Act, or

(B) disapprove the submittal in whole (or approve it in part; based on criteria established by the Administrator) and, simultaneously with such partial approval or subsequently within the twelve-month period under paragraph (2), disapprove it in part) if it does not meet all of the applicable requirements of this Act.

(4) Whenever the Administrator finds that the applicable implementation plan for any area is substantially inadequate to attain or maintain the relevant national ambient air quality standard, or to otherwise comply with any requirement of this Act, the Administrator shall require the State to revise the plan as necessary to correct such inadequacies. The Administrator shall notify the State of the inadequacies, and may establish reasonable deadlines for the submission of such plan revisions. Such findings and notice shall be public. Any finding under this paragraph shall, to the extent the Administrator deems appropriate, subject the State to the requirements of this Act to which the State was subject when it developed and submitted the plan for which such finding was made, except that the Administrator may adjust any dates applicable under such requirements as appropriate (except that the Administrator may not adjust any attainment date except as prescribed under part D).

(5) Whenever the Administrator determines that his action approving, disapproving, or promulgating any plan or plan revision (or part thereof), was in error, the Administrator may, in the same manner as the approval, disapproval, or promulgation, revise such action as appropriate without requiring any further submission from the State. Such determination and the basis thereof shall be provided to the State and be public.

[(e)(1) Upon application of a Governor of a State at the time of submission of any plan implementing a national ambient air quality primary standard, the Administrator may (subject to paragraph (2)) extend the three-year period referred to in subsection (a)(2)(A)(i) for not more than two years for an air quality control region if after review of such plan the Administrator determines that—

[(A) one or more emission sources (or classes of moving sources) are unable to comply with the requirements of such plan which implement such primary standard because the necessary technology or other alternatives are not available or will not be available soon enough to permit compliance within such three-year period, and

[(B) the State has considered and applied as a part of its plan reasonably available alternative means of attaining such primary standard and has justifiably concluded that attainment of such primary standard within the three years cannot be achieved.

[(2) The Administrator may grant an extension under paragraph (1) only if he determines that the State plan provides for—

[(A) application of the requirements of the plan which implement such primary standard to all emission sources in such region other than the sources (or classes) described in paragraph (1)(A) within the three-year period, and

[(B) such interim measures of control of the sources (or classes) described in paragraph (1)(A) as the Administrator determines to be reasonable under the circumstances.]

(e) Plan Revisions.—Each revision to an implementation plan submitted by a State under this Act shall be adopted by the State after reasonable notice and public hearing. The Administrator shall not approve a revision of a plan if the revision would interfere with any applicable requirement of this Act.

(f) Federal Implementation Plans.—

(1) The Administrator may, after notice and opportunity for public comment, promulgate regulations setting forth an implementation plan, or portion thereof, for a State whenever the Administrator—

(A) finds a State has failed to submit an implementation plan or revisions as required by this section or part C or D;

(B) determines that a plan, or portion thereof, submitted by a State is not in accordance with the requirements of this section or part C or D; or

(C) finds that any requirement of a previously approved plan is not being implemented.

(2) If, two years after the imposition of any sanctions under this section or part D for failure to submit a plan or portion thereof that meets the requirements of this section and part D, a State has failed to submit such plan, the Administrator shall propose regulations setting forth a plan, or portion of a plan, assuring that the requirements of this Act are met. The plan proposed by the Administrator shall be promulgated after notice and opportunity for public hearing in the State, but not later than one year after the date of proposal, unless, within such period, the State has adopted and submitted a plan which the Administrator has determined is in accordance with the provisions of this section and part D.

(3) Any plan proposed or promulgated pursuant to this paragraph shall meet all of the requirements of this section and part D, except that an initial plan for a nonattainment area may be promulgated without a demonstration of attainment, provided that such plan is revised by the Administrator not later than three years after the original date of proposal to include such demonstration.

(4) If, subsequent to the promulgation of an implementation plan by the Administrator, the State adopts and submits a plan, or portion of a plan, which meets all of the requirements of this section and part D, the Administrator may approve the

proposed State plan, or portion thereof, for implementation in lieu of the plan promulgated under this paragraph.

(g) SAVINGS CLAUSE.—Any provision of any applicable implementation plan or any revision thereof that was approved or promulgated by the Administrator pursuant to this section as in effect prior to the date of enactment of the Clean Air Act Amendments of 1989 shall remain in effect as part of such applicable implementation plan, except to the extent that a revision to such provision is approved or promulgated by the Administrator pursuant to this Act.

[(B)] *(h)(1)* As soon as practicable, the Administrator shall, consistent with the purposes of this Act and the Energy Supply and Environmental Coordination Act of 1974, review each State's applicable implementation plans and report to the State on whether such plans can be revised in relation to fuel burning stationary sources (or persons supplying fuel to such sources) without interfering with the attainment and maintenance of any national ambient air quality standard within the period permitted in this section. If the Administrator determines that any such plan can be revised, he shall notify the State that a plan revision may be submitted by the State. Any plan revision which is submitted by the State shall, after public notice and opportunity for public hearing, be approved by the Administrator if the revision relates only to fuel burning stationary sources (or persons supplying fuel to such sources), and the plan as revised complies with [paragraph (2) of this subsection.] *subsection (c).* The Administrator shall approve or disapprove any revision no later than three months after its submission.

[(C)] *(2)* Neither the State, in the case of a plan (or portion thereof) approved under this [subsection,] *section,* nor the Administrator, in the case of a plan (or portion thereof) promulgated under subsection [(c),] *(f)* shall be required to revise an applicable implementation plan because one or more exemptions under section 118 (relating to Federal facilities), enforcement orders under section 113(d), suspensions under section 110 [(f) or (g)] *(l) or (m)* (relating to temporary energy or economic authority), orders under section 119 (relating to primary nonferrous smelters), or extensions of compliance in decrees entered under section 113(e) (relating to iron- and steel-producing operations) have been granted, if such plan would have met the requirements of this section if no such exemptions, orders, or extensions had been granted.

[(D) Any applicable implementation plan for which an attainment date later than December 31, 1982, is provided pursuant to section 172(a)(2) shall be revised by July 1, 1979, to include the comprehensive measures and requirements referred to in subsection (c)(5)(B).

[(4) The procedure referred to in paragraph (2)(D) for review, prior to construction or modification, of the location of new sources shall (A) provide for adequate authority to prevent the construction or modification of any new source to which a standard of performance under section 111 will apply at any location which the State determines will prevent the attainment or maintenance within any air quality control region (or portion thereof) within such State of a national ambient air quality primary or secondary standard, and (B) require that prior to commencing construction or modification of any such source, the owner or operator thereof shall submit to such State such information as may be necessary to permit the State to make a determination under clause (A).

[(5)(A)(i) Any State may include in a State implementation plan, but the Administrator may not require as a condition of approval of such plan under this section, any indirect source review program. The Administrator may approve and enforce, as part of an applicable implementation plan, an indirect source review program which the State chooses to adopt and submit as part of its plan.

[(ii) Except as provided in subparagraph (B), no plan promulgated by the Administrator shall include any indirect source review program for any air quality control region, or portion thereof.

[(iii) Any State may revise an applicable implementation plan approved under section 110(a) to suspend or revoke any such program included in such plan, provided that such plan meets the requirements of this section.

[(B) The Administrator shall have the authority to promulgate, implement and enforce regulations under section 110(c) respecting indirect source review programs which apply only to federally assisted highways, airports, and other major federally assisted indirect sources and federally owned or operated indirect sources.

[(C) For purposes of this paragraph, the term "indirect source" means a facility, building, structure, installation, real property, road, or highway which attracts, or may attract, mobile sources of pollution. Such term includes parking lots, parking garages, and other facilities subject to any measure for management of parking supply (within the meaning of section 110(c)(2)(D)(ii)), including regulation of existing off-street parking but such term does not include new or existing on-street parking. Direct emissions sources or facilities at, within, or associated with, any indirect source shall not be deemed indirect sources for the purpose of this paragraph.

[(D) For purposes of this paragraph the term "indirect source review program" means the facility-by-facility review of indirect sources of air pollution, including such measures as are necessary to assure, or assist in assuring, that a new or modified indirect source will not attract mobile sources of air pollution, the emissions from which would cause or contribute to air pollution concentrations—

[(i) exceeding any national primary ambient air quality standard for a mobile source-related air pollutant after the primary standard attainment date, or

[(ii) preventing maintenance of any such standard after such date.

[(E) For purposes of this paragraph and paragraph (2)(B), the term "transportation control measure" does not include any measure which is an "indirect source review program."**]**

[(6)**]** *(i)* No State plan shall be treated as meeting the requirements of this section unless such plan provides that in the case of any source which uses a supplemental, or intermittent control system for purposes of meeting the requirements of an order under section 113(d) or section 119 (relating to primary nonferrous smelter orders), the owner or operator of such source may not temporarily reduce the pay of any employee by reason of the use of such supplemental or intermittent or other dispersion dependent control system.

[(3)**]** *(j)* Upon application of the chief excutive office of any general purpose unit of local government, if the Administrator determines that such unit has adequate authority under State or local law, the Administrator may delegate to such unit the authority to implement and enforce within the jurisdication of such unit any part of a plan promulgated under this subsection. Nothing in this paragraph shall prevent the Administrator from implementing or enforcing any applicable provision of a plan promulgated under this subsection.

(k) Applicable Implementation Plan.—(1) For purposes of this Act, an applicable implementation plan is the portion (or portions) of the implementation plan, or most recent revision thereof, which has been approved under this section, promulgated under subsection (f) and which implements the requirements of the Act. Such term includes any portion of an implementation plan which has been submitted by a State and approved by the Administrator. Notwithstanding any other provision of this Act, each provision of such implementation plan (and each permit in effect under such plan) shall remain in effect, and shall be enforced under this Act, until a revision of such plan is approved by the Administrator or a plan is promulgated by the Administrator under subsection (f).

[(f)**]** *(l)*(1) Upon application by the owner or operator of a fuel burning stationary source, and after notice and opportunity for public hearing, the Governor of the State in which such source is located may petition the President to determine that a national or regional energy emergency exists of such severity that—

(A) a temporary suspension of any part of the applicable implementation plan may be necessary, and

(B) other means of responding to the energy emergency may be inadequate.

Such determination shall not be delegable by the President to any other person. If the President determines that a national or regional energy emergency of such severity exists, a temporary emergency suspension of any part of an applicable implementation plan adopted by the State may be issued by the Governor of any State covered by the President's determination under the condition specified in paragraph (2) and may take effect immediately.

(2) A temporary emergency suspension under this subsection shall be issued to a source only if the Governor of such State finds that—

(A) there exists in the vicinity of such source a temporary energy emergency involving high levels of unemployment or loss of necessary energy supplies for residential dwellings; and

(B) such unemployment or loss can be totally or partially alleviated by such emergency suspension.

Not more than one such suspension may be issued for any source on the basis of the same set of circumstances or on the basis of the same emergency.

(3) A temporary emergency suspension issued by a Governor under this subsection shall remain in effect for a maximum of four months or such lesser period as may be specified in a disapproval order of the Administrator, if any. The Administrator may disapprove such suspension if he determines that it does not meet the requirements of paragraph (2).

(4) This subsection shall not apply in the case of a plan provision or requirement promulgated by the Administrator under subsection (c) of this section, but in any such case the President may grant a temporary emergency suspension for a four month period of any such provision or requirement if he makes the determinations and findings specified in paragraphs (1) and (2).

(5) The Governor may include in any temporary emergency suspension issued under this subsection a provision delaying for a period identical to the period of such suspension any compliance schedule (or increment of progress) to which such source is subject under section 119, as in effect before the date of the enactment of this paragraph or section 113(d) of this Act, upon a finding that such source is unable to comply with such schedule (or increment) solely because of the conditions on the basis of which a suspension was issued under this subsection.

[(g)] *(m)*(1) In the case of any State which has adopted and submitted to the Administrator a proposed plan revision which the State determines—

(A) meets the requirements of this section, and

(B) is necessary (i) to prevent the closing for one year or more of any source of air pollution, and

(ii) to prevent substantial increases in unemployment which would result from such closing, and

which the Administrator has not approved or disapproved under this section within [the required four month period,] *twelve months of submission of the proposed plan revision,* the Governor may issue a temporary emergency suspension of the part of the applicable implementation plan for such State which is proposed to be revised with respect to such source. The determination under subparagraph (B) may not be made with respect to a source which would close without regard whether or not the proposed plan revision is approved.

(2) A temporary emergency suspension issued by a Governor under this subsection shall remain in effect for a maximum of four months or such lesser period as may be specified in a disapproval order of the Adminsitrator. The Administrator may disapprove such suspension if he determines that it does not meet the requirements of this subsection.

(3) The Governor may include in any temporary emergency suspension issued under this subsection a provision delaying for a period identical to the period of such suspension any compliance schedule (or increment of progress) to which such source is subject under section 119 as in effect before the date of the enactement of this paragraph, or under section 113(d) upon a finding that such source is unable to comply with such schedule (or increment) solely because of the conditions on the basis of which a suspension was issued under this subsection.

[(h)] *(n)*(1) Not later than [one year after the date of enactment of the Clean Air Act Amendments of 1977 and annually thereafter,] *five years after the date of enactment of the Clean Air Act Amendments of 1989, and every three years thereafter,* the Administrator shall assemble and publish a comprehensive document for each State setting fourth all requirements of the applicable implementation plan for such State and shall publish notice in the Federal Register of the availability of such documents. [Each such document shall be revised as frequently as practicable but not less often than annually.]

(2) The Administrator may promulgate such regulations as may be reasonably necessary to carry out the purpose of this subsection.

[(i)] *(o)* Except for a primary nonferrous smelter order under section 119, a suspension under section 110 [(f) or (g)] *(l) or (m)* (relating to emergency suspensions), an exemption under section 118 (relating to certain Federal facilities), an order under section 113(d) (relating to compliance orders), a plan promulgation under section 110)(c), or a plan revision under section [110(a)(3),] *(110)(e),* no order, suspension, plan revision, or other action modifying any requirement of an applicable implementation plan may be taken with respect to any stationary source by the State or by the Administrator.

[(j)] *(p)* As a condition for issuance of any permit required under this title, the owner or operator of each new or modified stationary source which is required to obtain such a permit must show to the satisfaction of the permitting authority that the technological system of continuous emission reduction which is to be used will enable such source to comply with the standards of performance which are to apply to such source and that the construction or modification and operation of such source will be in compliance with all other requirements of this Act.

STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

SEC. 111. (a) For purposes of this section:

[(1) The term "standard of performance" means—

[(A) with respect to any air pollutant emitted from a category of fossil fuel fired stationary sources to which subsection (b) applies, a standard—

[(i) establishing allowable emission limitations for such category of sources, and

[(ii) requiring the achievement of a percentage reduction in the emissions from such category of sources from the emissions which would have resulted from the use of fuels which are not subject to treatment prior to combustion,

[(B) with respect to any air pollutant emitted from a category of stationary sources (other than fossil fuel fired sources) to which subsection (b) applies, a standard such as that referred to in subparagraph (A) (i); and

[(C) with respect to any air pollutant emitted from a particular source to which subsection (d) applies, a standard which the State (or the Administrator under the conditions specified in subsection (d) (2)) determines is applicable to that source and which reflects the degree of emission reduction achievable through the application of the best system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated for that category of sources.

For the purpose of subparagraphs (A) (i) and (ii) and (B), a standard of performance shall reflect the degree of emission, limitation and the percentage reduction achievable through application of the best technological system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated. For the purpose of subparagraph (1) (A) (ii), any cleaning of the fuel or reduction in the pollution characteristics of the fuel after extraction and prior to combustion may be credited, as determined under regulations promulgated by the Administrator, to a source which burns such fuel.]

(1) The term "standard of performance" means a standard for emissions of air pollutants which reflects the degree of emission limitation achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reduction and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated.

* * * * * * *

(d)(1) The Administrator shall prescribe regulations which shall establish a procedure similar to that provided by section 110 under which each State shall submit to the Administrator a plan which (A) establishes standards of performance for any existing source for any air pollutant (i) for which air quality criteria have not been issued or which is not included on a list published under section 108(a) or [112(b)(1)(A)] *112(b)* but (ii) to which a standard of performance under subsection (b) would apply if such existing source were a new source, and (B) provides for the implementation and enforcement of such standards of performance. Regulations of the Administrator under this paragraph shall permit the State in applying a standard of performance to any particular source under a plan submitted under this paragraph to take into consideration, among other factors, the remaining useful life of the existing source to which such standard applies.

* * * * * * *

(g)(1) * * *

* * * * * * *

[(5) Upon application by the Governor of a State showing that the Administrator has failed to list any air pollutant which causes, or contributes to, air pollution which may reasonably be anticipated to result in an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness as a hazardous air pollutant under section 112, the Administrator shall revise the list of hazardous air pollutants under such section to include such pollutant.

[(6) Upon application by the Governor of a State showing that any category of stationary sources of a hazardous air pollutant listed under section 112 is not subject to emission standards under such section, the Administrator shall propose and promulgate such emission standards applicable to such category of sources.]

[(7)] *(5)* Unless later deadlines for action of the Administrator are otherwise prescribed under this section, [or section 112,] the Administrator shall, not later than three months following the date of receipt of any application by a Governor of a State, either—

(A) find that such application does not contain the requisite showing and deny such application, or

(B) grant such application and take the action required under this subsection.

[(8)] *(6)* Before taking any action required by subsection (f) or by this subsection, the Administrator shall provide notice and opportunity for public hearing.

[NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

[SEC. 112. (a) For purposes of this section—

[(1) The term "hazardous air pollutant" means an air pollutant to which no ambient air quality standard is applicable and which in the judgment of the Administrator causes, or contributes to, air pollution which may reasonably be anticipated to result in an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness.

[(2) The term "new source' means a stationary source the construction or modification of which is commenced after the Administrator proposes regulations under this section establishing an emission standard which will be applicable to such source.

[(3) The terms "stationary source," "modification," "Owner or operator" and "existing source" shall have the same meaning as such terms have under section 111(a).

[(b)(1)(A) The Administrator shall, within 90 days after the date of enactment of the Clean Air Amendments of 1970, publish (and shall from time to time thereafter revise) a list which includes each hazardous air pollutant for which he intends to establish an emission standard under this section.

[(B) Within 180 days after the inclusion of any air pollutant in such list, the Administrator shall publish proposed regulations establishing emission standards for such pollutant together with a notice of a public hearing within thirty days. Not later than 180 days after such publication, the Administrator shall prescribe an emission standard for such pollutant, unless he finds, on the basis of information presented at such hearings, that such pollutant clearly is not a hazardous air pollutant. The Administrator shall establish any such standard at the level which in his judgment provides an ample margin of safety to protect the public health from such hazardous air pollutant.

[(C) Any emission standard established pursuant to this section shall become effective upon promulgation.

[(2) The Administrator shall, from time to time, issue information on pollution control techniques for air pollutants subject to the provisions of this section.

[(c)(1) After the effective date of any emission standard under this section—

[(A) no person may construct any new source or modify any existing source which, in the Administrator's judgment, will emit an air pollutant to which such standard applies unless the Administrator finds that such source if properly operated will not cause emission in violation of such standard, and

[(B) no air pollutant to which such standard applies may be emitted from any stationary source in violation of such standard, except that in the case of an existing source—

[(i) such standard shall not apply until 90 days after its effective date, and

[(ii) the Administrator may grant a waiver permitting such source a period of up to two years after the effective date of a standard to comply with the standard, if he finds that such period is necessary for the installation of controls and that steps will be taken during the period of the waiver to assure that the health of persons will be protected from imminent endangement.

[(2) The President may exempt any stationary source from compliance with paragraph (1) for a period of not more than two years if he finds that the technology to implement such standards is not available and the operation of such source is required for reasons of national security. An exemption under this paragraph may be extended for one or more additional period, each period not to exceed two years. The President shall make a report to Congress with respect to each exemption (or extension thereof made under this paragraph.

[(d)(1) Each State may develop and submit to the Administrator a procedure for implementing and enforcing emission standards for hazardous air pollutants for stationary sources located in such State. If the Administrator finds the State procedure is adequate, he shall delegate to such State any authority he has under this Act to implement and enforce such standards.

[(2) Nothing in this subsection shall prohibit the Administrator from enforcing any applicable emission standard under this section.

[(e)(1) For purposes of this section, if in the judgment of the Administrator, it is not feasible to prescribe or enforce an emission standard for control of a hazardous air pollutant or pollutants, he may instead promulgate a design, equipment, work practice, or operational standard, or combination thereof, which in his judgment is adequate to protect the public health from such pollutant or pollutants with an ample margin of safety. In the event the Administrator promulgates a design or equipment standard under this subsection, he shall include as part of such standard such requirements as will assure the proper operation and maintenance of any such elements of design or equipment.

[(2) For the purpose of this subsection, the phrase "not feasible to prescribe or enforce an emission standard" means any situation in which the Administrator determines that (A) a hazardous pollutant or pollutants cannnot be emitted through a conveyance designed and constructed to emit or capture such pollutant, or that any requirement for, or use of, such a conveyance would be inconsistent with any Federal, State, or local law, or (B) the application of measurement methodology to a particular class of sources is not practicable due to technological or economic limitations.

[(3) If after notice and opportunity for public hearing, any person establishes to the satisfaction of the Administrator that an alternative means of emission limitation will achieve a reduction in emissions of any air pollutant at least equivalent to the reduction in emissions of such air pollutant achieved under the requirements of paragraph (1), the Administrator shall permit the use of such alternative by the source for purposes of compliance with this section with respect to such pollutant.

[(4) Any standard promulgated under paragraph (1) shall be promulgated in terms of an emission standard whenever it becomes feasible to promulgate and enforce such standard in such terms.]

HAZARDOUS AIR POLLUTANTS

SEC. 112. (a) DEFINITIONS.—

(1) The term "major source" means any stationary source (including all emission points and units of such source located within a contiguous area and under common control) of air pollutants that emits considering installed and operating controls, in the aggregate, ten tons per year or more of any hazardous air pollutant or twenty-five tons per year or more of any combination of hazardous air pollutants. The Administrator may establish a lesser quantity, or in the case of radionuclides different criteria, for a major source than that specified in the previous sentence, on the basis of the potency of the air pollutant, persistence, potential for bioaccumulation, other characteristics of the air pollutant, or other relevant factors.

(2) The term "area source" means any stationary or mobile source of hazardous air pollutants that is not a major source.

(3) The term "stationary source" means any facility or installation or unit of such facility or installation which emits or may emit any hazardous air pollutant.

(4) The term "new source" means a source the construction or reconstruction of which is commenced after the Administrator first proposes regulations under this section establishing emissions standards applicable to such source.

(5) The term "hazardous air pollutant" means any air pollutant listed pursuant to subsection (b).

(6) For purposes of this section, the term "adverse environmental effects" means any threat of significant adverse effects, which may reasonably be anticipated, to wildlife, aquatic life, or other natural resources including disruption of local ecosystems, impacts on populations of endangered or threatened species, significant degradation of environmental quality over broad areas, or other comparable effects.

(7) The term "electric utility steam generating unit" means any fossil fuel fired steam electric generating unit that is constructed for the purpose of supplying more than one-third of its potential electric output capacity and more than twenty-five megawatts electrical output to any utility power distribution system.

(8) The terms "owner or operator" and "existing source" shall have the same meaning as such terms have under section 111(a).

(b) List of Pollutants.—

(1) The Congress establishes for purposes of this section a list of hazardous air pollutants as follows:

CAS number	Chemical name
75070	Acetaldehyde
60355	Acetamide
75058	Acetonitrile
98862	Acetophenone
53963	2-Acetylaminofluorine
107028	Acrolein
79061	Acrylamide
79107	Acrylic acid
107131	Acrylonitrile
107051	Allyl chloride
92671	4-Aminobiphenyl
7664417	Ammonia
62533	Aniline
90040	o-Anisidine
1332214	Asbestos
71432	Benzene (including benzene from gasoline)
92875	Benzidine
98077	Benzotrichloride
100447	Benzyl chloride
92524	Biphenyl
117817	Bis(2-ethylhexyl)phthalate (DEHP)
542881	Bis(chloromethyl)ether
75252	Bromoform
106990	1,3-Butadiene
156627	Calcium cyanamide
105602	Caprolactam
133062	Captan
63252	Carbaryl
75150	Carbon disulfide
56235	Carbon tetrachloride
463581	Carbonyl sulfide
120809	Catechol
133904	Chloramben
57749	Chlordane
7782505	Chlorine
79118	Chloroacetic acid
532274	2-Chloroacetophenone
108907	Chlorobenzene
510156	Chlorobenzilate
67663	Chloroform
107302	Chloromethyl methyl ether
126998	Chloroprene
1319773	Cresols/Cresylic acid (isomers and mixture)
95487	Cresols/Cresylic acid (isomers and mixture)
108394	Cresols/Cresylic acid (isomers and mixture)
106445	Cresols/Cresylic acid (isomers and mixture)
98828	Cumene
94757	2,4-D, salts and esters
3547044	DDE
334883	Diazomethane
132649	Dibenzofurans
96128	1,2-Dibromo-3-chloropropane
84742	Dibutylphthalate
106467	1,4-Dichlorobenzene(p)
91941	3,3-Dichlorobenzidene
111444	Dichloroethyl ether (Bis(2-chloroethyl)ether)

CAS number	Chemical name
542756	1,3-Dichloropropene
62737	Dichlorvos
111422	Diethanolamine
121697	N,N-Diethyl aniline (N,N-Dimethylaniline)
64675	Diethyl sulfate
119904	3,3-Dimethoxybenzidine
60117	Dimethyl aminoazobenzene
119937	3,3'-Dimethyl benzidine
79447	Dimethyl carbamoyl chloride
68122	Dimethyl formamide
57147	1,1-Dimethyl hydrazine
131113	Dimethyl phthalate
77781	Dimethyl sulfate
534521	4,6-Dinitro-o-cresol, and salts
51285	2,4-Dinitrophenol
121142	2,4-Dinitrotoluene
123911	1,4-Dioxane (1,4-Diethyleneoxide)
122667	1,2-Diphenylhydrazine
106898	Epichlorohydrin (1-Chloro-2,3-epoxypropane)
106887	1,2-Epoxybutane
140885	Ethyl acrylate
100414	Ethyl benzene
51796	Ethyl carbamate (Urethane)
75003	Ethyl chloride (Chloroethane)
106934	Ethylene dibromide (Dibromoethane)
107062	Ethylene dichloride (1,2-Dichloroethane)
107211	Ethylene glycol
151564	Ethylene imine (Aziridine)
75218	Ethylene oxide
96457	Ethylene thiourea
75343	Ethylidene dichloride (1,1-Dichloroethane)
50000	Formaldehyde
76448	Heptachlor
118741	Hexachlorobenzene
87683	Hexachlorobutadiene
77474	Hexachlorocyclopentadiene
67721	Hexachloroethane
822060	Hexamethylene-1,6-diisocyanate
680319	Hexamethylphosphoramide
110543	Hexane
302012	Hydrazine
7647010	Hydrochloric acid
7664393	Hydrogen fluoride (Hydrofluoric acid)
7783064	Hydrogen sulfide
123319	Hydroquinone
78591	Isophorone
58899	Lindane (all isomers)
108316	Maleic anhydride
67561	Methanol
72435	Methoxychlor
74839	Methyl bromide (Bromomethane)
74873	Methyl chloride (Chloromethane)
71556	Methyl chloroform (1,1,1-Trichloroethane)
78933	Methyl ethyl ketone (2-Butanone)
60344	Methyl hydrazine
74884	Methyl iodide (Iodomethane)
108101	Methyl isobutyl ketone (Hexone)
624839	Methyl isocyanate
80626	Methyl methacrylate
1634044	Methyl tert butyl ether
101144	4,4-Methylene bis(2-chloroaniline)
75092	Methylene chloride (Dichloromethane)
101688	Methylene diphenyl diisocyanate (MDI)
101779	4,4'-Methylenedianiline
91203	Naphthalene

CAS number	Chemical name
98953	Nitrobenzene
92933	4-Nitrobiphenyl
100027	4-Nitrophenol
79469	2-Nitropropane
684935	N-Nitroso-N-methylurea
62759	N-Nitrosodimethylamine
59892	N-Nitrosomorpholine
56382	Parathion
82688	Pentachloronitrobenzene (Quintobenzene)
87865	Pentachlorophenol
108952	Phenol
106503	p-Phenylenediamine
75445	Phosgene
7803512	Phosphine
7723140	Phosphorus
85449	Phthalic anhydride
1336363	Polychlorinated biphenyls (Aroclors)
1120714	1,3-Propane sultone
57578	beta-Propiolactone
123386	Propionaldehyde
114261	Propoxur (Baygon)
78875	Propylene dichloride (1,2-Dichloropropane)
75569	Propylene oxide
75558	1,2-Propylenimine (2-Methyl aziridine)
91255	Quinoline
106514	Quinone
100425	Styrene
96093	Styrene oxide
1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin
79345	1,1,2,2-Tetrachloroethane
127184	Tetrachloroethylene (Perchloroethylene)
7550450	Titanium tetrachloride
108883	Toluene
95807	2,4-Toluene diamine
584849	2,4-Toluene diisocyanate
95534	o-Toluidine
8001352	Toxaphene (chlorinated camphene)
120821	1,2,4-Trichlorobenzene
79005	1,1,2-Trichloroethane
79016	Trichloroethylene
95954	2,4,5-Trichlorophenol
88062	2,4,6-Trichlorophenol
121448	Triethylamine
1582098	Trifluralin
540841	2,2,4-Trimethylpentane
108054	Vinyl acetate
593602	Vinyl bromide
75014	Vinyl chloride
75354	Vinylidene chloride (1,1-Dichloroethylene)
1330207	Xylenes (isomers and mixture)
95476	Xylenes (isomers and mixture)
108383	Xylenes (isomers and mixture)
106423	Xylenes (isomers and mixture)
0	Antimony Compounds
0	Arsenic Compounds (inorganic including arsine)
0	Beryllium Compounds
0	Cadmium Compounds
0	Chromium Compounds
0	Cobalt Compounds
0	Coke Oven Emissions
0	Cyanide Compounds[1]
0	Glycol ethers[2]
0	Lead Compounds
0	Manganese Compounds
0	Mercury Compounds

CAS number	*Chemical name*
0	*Mineral fibers* [3]
0	*Nickel Compounds*
0	*Polycylic Organic Matter* [4]
0	*Radionuclides (including radon)* [5]
0	*Selenium Compounds*

NOTE: For all listings above which contain the word "compounds" and for glycol ethers, the following applies: Unless otherwise specified, these listings are defined as including any unique chemical substance that contains the named chemical (i.e., antimony, arsenic, etc.) as part of that chemical's infrastructure.

[1] *X'CN where X = H' or any other group where a formal dissociation may occur. For example KCN or* $Ca(CN)_2$

[2] *includes mono- and di- ethers of ethylene glycol, diethylene glycol, and triethylene glycol* $R\text{-}(OCH2CH2)_n\text{-}OR'$ *where*

$n = 1, 2, \text{or } 3$

R = alkyl or aryl groups

R' = R, H, or groups which, when removed, yield glycol ethers with the structure: $R\text{-}(OCH2CH)_n\text{-}OH$

Polymers are excluded from the glycol category

[3] *includes glass microfibers, glass wool fibers, rock wool fibers, and slag wool fibers, each characterized as "respirable" (fiber diameter less than 3.5 micrometers) and possessing an aspect ratio (fiber length divided by fiber diameter) greater than 3.*

[4] *includes organic compounds with more than one benzene ring, and which have a boiling point greater than or equal to 100°C*

[5] *a type of atom which spontaneously undergoes radioactive decay.*

(2) The Administrator shall, from time to time, but not less often than every five years, review and revise the list established by paragraph (1) adding pollutants which present, or may present, through inhalation or other routes of exposure, a threat of adverse human health effects (including, but not limited to, substances which are known to be, or may reasonably be anticipated to be, carcinogenic, mutagenic, teratogenic, neurotoxic, which cause reproductive dysfunction, or which are acutely or chronically toxic but not including effects for which a pollutant has been listed pursuant to section 108 of this Act) or adverse environmental effects whether through ambient concentrations, bioaccumulation, deposition, or otherwise, but not including releases subject to regulation under section 129 as a result of emissions to the air. No substance, practice, process, or activity regulated under title V of this Act shall be subject to regulation under this section solely due to its adverse effects on the environment.

(3)(A) Any person may petition the Administrator to modify the list established by paragraph (1) by adding or deleting a substance. Any such petition shall include a showing by the petitioner that there is adequate data on the health effects of the pollutant or other evidence adequate to support the petition. Within twelve months after receipt of a petition the Administrator shall either grant the petition or publish a statement of the reasons for not granting the petition. The Administrator may not deny a petition on the basis of inadequate resources or time for review.

(B) The Administrator shall add a substance to the list upon a showing by the petitioner or on the Administrator's own determination that the substance is an air pollutant and that emissions, ambient concentrations, bioaccumulation or deposition of the substance are known to cause or may reasonably be anticipated to cause adverse effects to human health or adverse environmental effects, or that the substance is an air pollutant that qualifies for addition to the list established under section

313 of the Emergency Planning and Community Right-to-Know Act of 1986.

(C) The Administrator shall remove a substance from the list upon a showing by the petitioner or on the Administrator's own determination that there is adequate data on the health and environmental effects of the substance to determine that emissions, ambient concentrations, bioaccumulation or deposition of the substance may not reasonably be anticipated to cause any adverse effects to the human health or adverse environmental effects, or that the substance qualifies for deletion from the list established under section 313 of the Emergency Planning and Community Right-to-Know Act of 1986. Action by the Administrator pursuant to section 313(d)(3) of such Act prior to the date of enactment of this paragraph shall constitute a deletion for the purposes of this section.

(4) If the Administrator determines that information on the health or environmental effects of a substance is not sufficient to make a determination required by this subsection, the Administrator may use the authorities of section 104(i) of the Comprehensive Environmental Response, Compensation, and Liability Act and other information-gathering authorities under such Act and other laws administered by the Agency to acquire such information.

(5) The Administrator may establish test measures and other analytic procedures for monitoring and measuring emissions, ambient concentrations, deposition, and bioaccumulation of hazardous air pollutants.

(c) LIST OF SOURCE CATEGORIES.—

(1) Not later than twelve months after the date of enactment of this paragraph and after notice and opportunity for public comment, the Administrator shall publish (and from time to time revise) a list including all categories and subcategories of major sources of hazardous air pollutants which shall, to the extent practicable, be consistent with the list of source categories established pursuant to section 111 and part C of this Act.

(2) The Administrator shall list under this subsection and designate for regulation under subsection (d) each category or subcategory of area sources which the Administrator finds presents a threat of adverse effects to human health or the environment (by such sources individually or in the aggregate) warranting regulation under this section.

(3) In addition to those categories and subcategories of sources designated for regulation pursuant to paragraphs (1) and (2), the Administrator may at any time designate additional categories and subcategories of sources of hazardous air pollutants according to the same criteria for designation applicable under such paragraphs and at the time of designation shall establish a date for the promulgation of emissions standards under subsection (d).

(4) At the time of setting a standard for any category or subcategory of sources pursuant to subsection (d), (f), or (g), the Administrator shall also establish a minimum emissions rate for each hazardous air pollutant emitted by sources in the category or subcategory reflecting the criteria for listing a hazardous air

pollutant established by subsection (b)(2). All sources in the category or subcategory emitting more than the minimum emissions rate for any hazardous air pollutant shall be subject to standards promulgated under subsection (d), (f), or (g). In no event shall the minimum emissions rate be greater than ten tons per year for any one hazardous air pollutant or twenty-five tons per year for any combination of such pollutants.

(5) Notwithstanding the provisions of paragraph (4), the Administrator may establish a minimum emissions rate of more than ten tons for a category or subcategory and a pollutant for which a health effects threshold can be established, provided that, the minimum emissions rate assures, with an ample margin of safety, such threshold will not be exceeded within the vicinity of the sources in the category and that no adverse environmental effects will occur as the result of emissions from the sources individually or in combination with emissions from other similar sources.

(6) With respect to alkylated lead compounds, polycyclic organic matter, hexachlorobenzene, mercury, polychlorinated biphenyls, 2,3,7,8-tetrachlorodibenzofurans and 2,3,7,8-tetrachlorodibenzo-p-dioxin, the Administrator shall establish minimum emissions rates for categories and subcategories of sources assuring that sources accounting for not less than 90 per centum of the aggregate emissions of each such pollutant are subject to standards under subsection (d)(1).

(d) EMISSIONS STANDARDS.—

(1) The Administrator shall promulgate emissions standards for every category or subcategory of sources of hazardous air pollutants designated for regulation pursuant to subsection (c).

(2) Emissions standards promulgated under this subsection and applicable to new or existing sources of hazardous air pollutants shall require the maximum degree of reduction in emissions of each air pollutant subject to this section (including a prohibition on such emissions, where achievable) that the Administrator, taking into consideration the cost of achieving such emissions reduction, and any non-air-quality health and environmental impacts and energy requirements, determines is achievable for new or existing sources in the category or subcategory to which such emissions standard applies, through application of measures, processes, methods, systems or techniques including, but not limited to, measures which—

(A) reduce the volume of such pollutants through process changes, substitution of materials, or other modifications,

(B) enclose systems or processes to eliminate emissions,

(C) collect, capture, or treat such pollutants when released from a process, stack, storage, or fugitive emissions point,

(D) are design, equipment, work practice, or operational standards (including requirements for operator training or certification as provided in subsection (h)), or

(E) are a combination of the above.

(3) The degree of reduction in emissions that is deemed achievable for new sources in a category or subcategory shall not be less stringent than the most stringent emissions level

that is achieved in practice by a source in the same category or subcategory, as determined by the Administrator, and may be more stringent where feasible. Emissions standards under this subsection for existing sources in a category or subcategory may be less stringent than standards for new sources in a similar category or subcategory, if the Administrator determines that the level of control applicable to new sources is generally technically or economically infeasible for existing sources in the category or subcategory and, considering, sequentially, the level of control achieved by existing sources in the category or subcategory beginning with the most stringent such level, establishes an emissions limitation which is generally feasible and assures the maximum total reduction in emissions from all sources in the category or subcategory. The Congress finds that a reduction of 90 per centum (95 per centum in the case of particulates) from uncontrolled levels is an appropriate benchmark for emissions standards applicable to existing sources under this subsection.

(4) With respect to pollutants for which a health threshold can be established, the Administrator may consider such threshold level, with an ample margin of safety, when establishing emissions standards under this subsection.

(5) With respect only to categories and subcategories of area sources listed pursuant to subsection (c)(2), the Administrator is authorized, in addition to the authorities provided in paragraph (2) and subsections (f) and (g), to promulgate standards or requirements applicable to sources in such categories or subcategories which provide for the use of cost-effective and generally available control technologies or management practices by such sources to reduce emissions of hazardous air pollutants.

(6) The Administrator shall review, and revise as necessary (taking into account developments in practices, processes, and control technologies), emissions standards promulgated under this section no less often than every seven years.

(7) No emissions standard or other requirement promulgated under this section shall be interpreted, construed or applied to diminish or replace the requirements of a more stringent emission limitation or other applicable requirement established pursuant to section 111, part C, section 172(b) (3) or (6), or other authority of this Act or a standard issued under State authority.

(8) Emissions standards promulgated under this subsection shall be effective upon promulgation.

(e) SCHEDULE FOR STANDARDS AND REVIEW.—

(1) The Administrator shall promulgate regulations establishing emissions standards for categories and subcategories of sources designated for regulation pursuant to subsection (c) as expeditiously as practicable, assuring that—

(A) emissions standards for categories or subcategories of sources of acrylonitrile, benzene, 1,3-butadiene, cadmium, carbon tetrachloride, chloroform, chromium, ethylene dichloride, ethylene oxide, methylene chloride, perchloroethylene, trichloroethylene, and coke oven emissions are promulgated not later than twenty-four months after the date of enactment of the Clean Air Act Amendments of 1989;

(B) emissions standards for 25 per centum of the categories and subcategories designated pursuant to subsection (c) (1) and (2) shall be promulgated not later than three years after such date;

(C) emissions standards for 50 per centum of the categories or subcategories designated pursuant to subsection (c) (1) and (2) shall be promulgated not later than five years after such date; and

(D) emissions standards for all categories and subcategories designated for regulation pursuant to subsection (c) (1) and (2) shall be promulgated not later than ten years after such date.

(2) In determining priorities for scheduling the promulgation of standards pursuant to subparagraphs (1) (B), (C), and (D), the Administrator shall consider—

(A) the known or anticipated adverse effects of such pollutants on human health and the environment;

(B) exposure to and the location of major sources of such pollutants including risks to individuals most exposed and the consequent urgency of a national standard;

(C) the quantity of hazardous air pollutants that sources in each category or subcategory emit; and

(D) the efficiency of grouping the categories or subcategories according to the pollutants emitted or the processes or technologies used.

(3) Not later than twenty-four months after the date of enactment of the Clean Air Act Amendments of 1989 and after opportunity for comment, the Administrator shall publish a schedule establishing a date for the promulgation of emissions standards for each category and subcategory of sources listed pursuant to subsection (c) (1) and (2) which shall be consistent with the requirements of paragraphs (1) and (2). The determination of priorities for the promulgation of standards pursuant to this paragraph is not a rulemaking and shall not be subject to judicial review, except that, failure to promulgate any standard pursuant to the schedule established by this paragraph shall be subject to review under section 304 of this Act.

(4) If, under other provisions of this Act, the Administrator is proposing or promulgating requirements applicable to a class of sources similar to a category or subcategory listed pursuant to this section, the Administrator may simultaneously propose or promulgate emissions standards under this section for such category or subcategory notwithstanding the priorities established by paragraph (2). Nothing in this paragraph shall be construed or applied to stay a deadline for control requirements otherwise applicable under this or other law.

(5) The Administrator shall not promulgate any standard with respect to the emissions of chlorine or compounds containing chlorine from electric utility steam generating units before the date three years after the date of enactment of this paragraph.

(6) Notwithstanding the provisions of paragraph (1), the Administrator shall promulgate standards pursuant to subsection (d) applicable to publicly owned treatment works (as defined in

title II of the Federal Water Pollution Control Act) not earlier or later than five years after the date of enactment of this paragraph.

(7)(A) Not later than three years after the initial promulgation of emissions standards for a category or subcategory of sources pursuant to subsection (d), the Administrator shall commence an evaluation of the risks to human health and the environment resulting from emissions of hazardous air pollutants by sources in the category or subcategory remaining after application of such standards. If the Administrator finds as the result such evaluation, that emissions of hazardous air pollutants from sources in the category or subcategory (or portion thereof), individually or in the aggregate, after application of the prescribed standards, present a significant risk of adverse effects on public health or a threat of adverse environmental effects, the Administrator shall complete, within two years after the date of commencement, such evaluation and revise standards applicable to such category or subcategory (or portion thereof) using the authorities of subsection (f) or (g), as appropriate.

(B) The Administrator shall take such steps as are necessary, including studies pursuant to section 104(i) of the Comprehensive Environmental Response, Compensation, and Liability Act, to assure that adequate data on the health and environmental effects of any hazardous air pollutant emitted by sources in a category or subcategory subject to review under this paragraph are available at the commencement of the evaluation.

(C) To the extent that standards promulgated under subsection (d) do not eliminate lifetime risks of carcinogenic effects greater than one in one million to the individual in the population who is most exposed to emissions of a pollutant (or stream of pollutants) from a source in the category or subcategory (as determined according to Guidelines for Carcinogenic Risk Assessment published by the Administrator), the Administrator shall use the authorities of subsection (f) to revise the standards applicable to such pollutant (or stream of pollutants) and categories or subcategories. To the extent that standards promulgated under subsection (d) do not reduce emissions to a level at or below the threshold for adverse health effects, with an ample margin of safety, for pollutants other than carcinogens, the Administrator shall use the authorities of subsection (g) to revise the standards applicable to such pollutants and categories or subcategories. With respect to any hazardous air pollutant which is both a carcinogen and causes adverse health effects for which a threshold exists, the Administrator shall establish standards pursuant to subsection (f) for sources of such pollutant, unless a more stringent standard than would be promulgated pursuant to subsection (f)(1)(A) is necessary to assure that such threshold, with an ample margin of safety, will not be exceeded. The Administrator shall in any such case establish a standard under subsection (g) in lieu of the standard which would be applicable under (f)(1)(A).

(f) ADDITIONAL REGULATION OF CARCINOGENS.—

(1) The Administrator is authorized to promulgate emissions standards under this subsection applicable to categories or subcategories of sources of any hazardous air pollutant which is a known, probable, or possible human carcinogen. For each such pollutant (or stream of pollutants containing carcinogens) the Administrator shall establish two simultaneously applicable standards including—

(A) a standard which eliminates all lifetime risks of carcinogenic effects greater than one in ten thousand to the individual in the population who is most exposed to emissions of a pollutant (or stream of pollutants) from a source in the category or subcategory; and

(B) a standard which eliminates all lifetime risks of carcinogenic effects greater than one in one million to the individual in the population who is most exposed to emissions of a pollutant (or stream of pollutants) from a source in the category or subcategory.

No consideration of cost, cost effectiveness, economic, energy, or other factors or technological feasibility shall be included in the determination of the appropriate level of any emissions standard under this subsection.

(2) Any standards promulgated under this subsection shall be effective upon the date of promulgation.

(g) STANDARDS TO PROTECT HEALTH AND THE ENVIRONMENT.—

(1) The Administrator is authorized to promulgate emissions standards under this subsection applicable to categories or subcategories of sources of any hazardous air pollutant which is not a carcinogen. The Administrator shall establish any emission standard or standards under this subsection at the level which, in the judgment of the Administrator, provides an ample margin of safety to protect the public health, unless a more stringent standard is required to protect the environment. No consideration of costs, cost effectiveness, economic, energy, or other factors or technological feasibility shall be included in the determination of the appropriate level of any emission standard or the margin of safety to protect the public health under this subsection.

(2) Any emission standard established pursuant to this subsection shall become effective upon promulgation.

(h) WORK PRACTICE STANDARDS AND OTHER REQUIREMENTS.—

(1)(A) In addition to any numerical emissions limitation established under this section, the Administrator is authorized to promulgate a design, equipment, work practice, or operational standard (including requirements for operator training or certification), or combination thereof, applicable to sources in categories or subcategories listed pursuant to subsection (c) and consistent with the provisions of subsection (d), (f), or (g). The Administrator shall promulgate such standards whenever it is not feasible to prescribe or enforce an emission standard for a category or subcategory for control of hazardous air pollutants (or a stream of such pollutants). In the event the Administrator promulgates a design or equipment standard under this paragraph, the Administrator shall include as part of such standard such

requirements as will assure the proper operation and maintenance of any such element of design or equipment.

(B) For the purpose of this paragraph, the phrase 'not feasible to prescribe or enforce an emission standard' means any situation in which the Administrator determines that (i) a pollutant (or stream of pollutants) listed pursuant to subsection (b) cannot be emitted through a conveyance designed and constructed to emit or capture such pollutant, or that any requirement for, or use of, such a conveyance would be inconsistent with any Federal, State, or local law, or (ii) the application of measurement methodology to a particular category or subcategory of sources is not practicable due to technological and economic limitations.

(C) If after notice and opportunity for public hearing, any person establishes to the satisfaction of the Administrator that an alternative means of emission limitation will achieve a reduction in emissions of any air pollutant (or stream of pollutants) at least equivalent to the reduction in emissions of such pollutant achieved under the requirements of subparagraph (A), the Administrator shall permit the use of such alternative by the source for purposes of compliance with this section with respect to such pollutant.

(D) Any standard promulgated under subsections (d), (f), or (g) shall include a numerical emissions limitation whenever it is feasible to promulgate and enforce a standard in such terms.

(2) For the purposes of developing or assisting in the development of any standard, requirement, or regulation, conducting any study, or enforcing the provisions of this section, the Administrator (or a State with an approved program under subsection (1)) may require the owner or operator of any facility which emits air pollutants subject to this section or stores any substance subject to section 129 of this act to monitor for the presence of such pollutant in the emissions (both point and nonpoint) from such source and in the ambient air within the vicinity of the facility, to install and maintain leak detection systems, and to keep records and make reports on the results of such monitoring and leak detection.

(3)(A) Emissions standards promulgated pursuant to this section shall include, where appropriate, leak prevention, detection and correction requirements consistent with the provisions of subsection (d)(2) and may include monitoring, recordkeeping, reporting, vapor recovery, secondary containment, or other requirements, which shall be applicable to devices and systems (including pumps, compressors, valves, flanges, connectors, containers, and vessels) from which there may be emissions of any pollutant subject to this section.

(B) Regulations under this paragraph may require the owner or operator of a source to carry out an annual audit and safety inspection to locate and correct all leaks and other preventable routine or episodic releases of any air pollutant subject to this section. The results of such inspection and the results of any other safety inspection, survey, or audit carried out with respect to the source shall be available to the Administrator, to the State in which the source is located, and to the public, consistent with the provisions of sections 322, 323, and 324 of the

Emergency Planning and Community Right-to-Know Act of 1986.

(4) Any design, equipment, work practice, or operational standard, audit or monitoring requirement or any combination thereof, described in this subsection shall be treated as an emission standard for purposes of the provisions of this Act (other than the provisions of this subsection).

(i) Schedule for Compliance.—

(1) After the effective date of any emission standard, limitation, or regulation under subsection (d), (f), (g), or (h), no person may construct any new major source or reconstruct any existing major source subject to such emission standard or limitation unless the Administrator (or a State with a permit program approved under subsection (j)) determines that such source, if properly constructed and operated, will comply with the standard or limitation.

(2) After the effective date of any emissions standard under this section, no air pollutant may be emitted from any source in violation of an emissions standard under this section, except in the case of an existing source, the Administrator shall establish a compliance date or dates for each category or subcategory of existing sources, which shall provide for compliance as expeditiously as practicable, but in no event later than three years after the effective date of such standard, except as provided in paragraphs (3) through (8).

(3) With respect to standards established pursuant to subsection (f)(1)(A), the Administrator after consultation with the State in which the source is located may grant an extension permitting an existing source a period of up to five additional years to comply with such standard, if the Administrator determines, based on specific information submitted by the owner or operator of the source estimating costs and effectiveness of good faith compliance efforts and other available information, that—

(A) the owner or operator would experience extraordinary economic hardship in compliance with such standard and requires that such source or category of sources comply with the emissions standard promulgated pursuant to subsection (d); and

(B) during the period of the extension, emissions, standards applicable to the source shall assure that the health of persons will be protected from any imminent and substantial endangerment.

Compliance with standards promulgated pursuant to subsection (f)(1)(A) shall not be stayed during the pendency of any judicial proceeding to review a determination made under this paragraph.

(4)(A) With respect to standards promulgated pursuant to subsection (f)(1)(B) the Administrator (or a State acting pursuant to a program approved under subsection (l)) may grant an existing source a temporary exception from the standard, if the Administrator (or the State) determines, based on specific information provided by the owner or operator of the source and other information, that the standard cannot be achieved by the source

using all available technology and operational controls and that the source will implement a risk-reduction program employing all such technology and controls. For purposes of this subparagraph the phrase "all available technology and operational controls" shall include all measures which are technically feasible including process modifications and materials substitution to reduce emissions of hazardous air pollutants from the source. The Administrator (or the State) may require the owner or operator of the source to conduct research and development on improved or more effective control technologies or management practices as a condition for any temporary exception or permit renewal pursuant to this paragraph.

(B) Any request for an exception under this paragraph shall be submitted within six months of the date of promulgation of the applicable standard and shall include all information necessary for the Administrator (or the State) to make a determination with respect to the eligibility of a source for an exception. The Administrator (or the State) shall review and approve or disapprove any request within one year of submittal. Any request failing to meet the requirements of this subparagraph shall be deemed denied.

(C) An exception may only be granted under this paragraph, if the Administrator (or the State) has provided notice of the proposed exception and has provided an opportunity for public comment and a public hearing on the conditions of the proposed exception. The Administrator may review, on appeal by any person or on the Administrator's own motion, and reverse any exception granted by a State under this paragraph. The Administrator shall make a determination with respect to any appeal within one hundred and eighty days.

(D) An exception granted under this paragraph shall be reviewed upon renewal of the permit for the source, and may be extended after a further determination subject to the same terms and conditions as applicable in the first instance.

(5) The President may exempt any source from compliance with paragraph (1) for a period of not more than two years if the President finds that the technology to implement such standards is not available and the operation of such source is required for reasons of national security. An exemption under this paragraph may be extended for one or more additional periods, each period not to exceed two years. The President shall make a report to Congress with respect to each exemption (or extension thereof) made under this paragraph.

(6)(A) The Administrator (or a State acting pursuant to a program approved under subsection (l)) shall exempt any existing source from an emissions standard promulgated pursuant to subsection (d) upon a showing by the owner or operator of such source that it has achieved a voluntary reduction of 90 per centum or more in emissions of hazardous air pollutants (95 per centum or more in the case of a pollutant which is a particulate) from the source on or before December 31, 1992.

(B) The reduction shall be determined with respect to verifiable and actual emissions in a base year not earlier than calendar year 1985, provided that, there is no evidence that emissions

in the base year are artificially or substantially greater than emissions in other years prior to implementation of emissions reduction measures. Emissions data satisfying all requirements imposed pursuant to section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 shall be considered "verifiable and actual" for the purpose of establishing base year emissions.

(C) For each source granted an exemption under this paragraph there shall be established by a permit issued pursuant to subsection (j) an enforceable emissions limitation for hazardous air pollutants reflecting the reduction which qualifies the source for an exemption under this paragraph. An exemption under this paragraph shall not include an exemption from standards or requirements promulgated pursuant to subsection (f) or (g) and the Administrator shall review emissions from sources granted exemptions under this paragraph according to the provisions of subsection (e)(7) at the same time that other sources in the category or subcategory are reviewed.

(D) For purposes of this paragraph, the term "voluntary" means not otherwise required by a Federal, State, or local air pollution control law or regulation.

(E) The Administrator shall promulgate regulations to carry out the provisions of this paragraph as expeditiously as practicable, but not later than twelve months after the date of enactment of the Clean Air Act Amendments of 1989. Such regulations may include fees sufficient to offset the costs of reviewing applications for exemptions submitted under this paragraph. Revenues from such fees received by the Administrator shall, notwithstanding the provisions of the Miscellaneous Receipts Act, be used for the purpose of administering this section.

(F) With respect to pollutants for which high risks of adverse human health effects may be associated with exposure to small quantities including, but not limited to, chlorinated dioxins and furans, the Administrator shall by regulation limit the use of offsetting reductions in emissions of other hazardous air pollutants from the source as counting toward the 90 per centum reduction in such high-risk pollutants qualifying for an exemption under this paragraph.

(7) Notwithstanding the requirements of this section, no existing source that has installed—

(A) reasonably available control technology (which achieves a reduction of 80 per centum or more from uncontrolled levels of hazardous air pollutants emitted by the source),

(B) best available control technology (as defined in section 169(3)),

(C) technology required to meet a lowest achievable emissions rate, or

(D) has voluntarily achieved (as certified to the Administrator) on or after January 1, 1993, a reduction of 90 per centum in the emissions of the hazardous air pollutants emitted by the source,

prior to the promulgation of a standard under this section applicable to such source and the same pollutant (or stream of *pollutants) controlled pursuant to an action described in subparagraph (A), (B), (C), or (D) shall be required to comply with such standard under this section until the date five years after the date on which such installation or reduction has been achieved, as determined by the Administrator. The Administrator may issue such rules and guidance as are necessary to implement this paragraph.*

(8)(A) If at any source a hazardous air pollutant is subject to regulation under this section because the source emits more than the minimum emissions rate of other pollutants, the Administrator (or a State acting pursuant to a program approved under subsection (l)) may, at the request of the owner or operator of the source, waive the requirements applicable to such pollutant where emissions of the pollutant are in de minimis amounts and do not present a significant risk of adverse effects to human health or adverse environmental effects and control of the pollutant would require installation of additional and separate control technologies for that pollutant only.

(B) Applications for waivers under this paragraph shall be submitted not later than four months after the effective date of the relevant standard and the Administrator (or the State) shall make a determination on any application within six months of submission. Applications which are not complete shall be deemed denied without further opportunity for reapplication. An application for a waiver under this paragraph shall not stay the applicant's obligation to comply with emissions standards applicable to other pollutants. Applications shall be accompanied by fees adequate to offset all direct and indirect costs of reviewing such applications. Not later than eighteen months after the date of enactment of this paragraph, the administrator shall publish guidance on procedures for application and review.

(j) PERMIT PROGRAM.—

(1) Except as provided in paragraph (2) and after the date of enactment of this section, it shall be unlawful for any person to construct a new source, or for the owner or operator of any source to emit any air pollutant, subject to any emissions standard under this section, except in compliance with a permit issued by the Administrator (or a State acting pursuant to a program approved under subsection (l)) under this subsection. The Administrator shall promulgate within twelve months after the date of enactment of this subsection regulations establishing the minimum elements of a permit program. These elements shall include—

(A) requirements for permit applications, including a standard application form and fees sufficient to offset the direct and indirect cost of processing applications;

(B) requirements for monitoring (including continuous emissions monitoring, unless determined to be unavailable or inappropriate) the mass and rate of emissions for each hazardous air pollutant emitted by the source according to test procedures established by the Administrator, reporting of monitoring results not less frequently than annually and

the maintenance of such records with respect to monitoring which the Administrator shall require;

(C) a requirement that permittees pay an annual fee sufficient to offset all direct and indirect costs of administering the program (if such fees are paid to the Administrator, the Administrator may, notwithstanding any requirement of the Miscellaneous Receipts Act, expend such receipts for the purposes of administering the provisions of this section); and

(D) a requirement that any State seeking approval of a program pursuant to subsection (l) have adequate personnel and funding to administer the program and adequate authority to—

(i) issue permits that apply, and assure compliance by all sources within the State with, each applicable standard, regulation or requirement under this section;

(ii) issue permits for a fixed term, not to exceed five years;

(iii) terminate or modify permits for cause, including establishment of a new emissions standard applicable to the source;

(iv) enforce permits and the requirement to obtain a permit, including adequate civil and criminal penalties;

(v) provide public notice of each application for a permit and an opportunity for public hearing before a determination on each such application; and

(vi) assure that no permit will be issued if the Administrator timely objects to its issuance.

No fee schedule established by the Administrator under this subsection shall be designed with the purpose of supporting other aspects of any State air pollution control program including elements for control of area sources or prevention of accidents. Nothing in this subsection shall prevent a State from imposing additional permit fees, except that, the Administrator shall not approve any program pursuant to subsection (1), if revenues from such fees are used for purposes other than the development and implementation of programs to control the emissions of hazardous air pollutants. When issuing permits in the absence of an approved State program, the Administrator shall comply with the guidelines issued to implement this paragraph.

(2)(A) Notwithstanding the requirements of paragraph (1), an existing source in a category or subcategory subject to an emissions standard under this section may continue operations prior to the issuance of a permit, provided that, the owner or operator of the source certifies to the Administrator (or to the State) that the source will comply with all applicable standards and requirements under this section. Certification pursuant to this paragraph shall be provided not later than six months after the effective date of any applicable standard or revision of a standard under this section. The certification shall be accompanied by a compliance plan describing means by which the source intends to achieve the standard on and after the compliance date established by subsection (i) and shall be signed by a responsi-

ble official of the business concern owning or operating the source.

(B) Upon receipt of any certification, the Administrator (or the State) shall issue a temporary operating permit for the source, unless within thirty days the Administrator (or the State) notifies the owner or operator of the source that the certification does not adequately demonstrate compliance with all applicable standards and requirements under this section. Any temporary permit issued under this paragraph shall be for a term not exceeding one year and shall be enforceable to the same extent as any standard or other requirement promulgated under this section.

(C) Within six months of the issuance of any temporary operating permit for any source under this paragraph, the Administrator (or the State) shall complete a review of the operations of such source, including an inspection at the site of the source, to determine whether a full operating permit under this subsection should be issued. If upon conclusion of such review (including any right to administrative appeal, but not including pendency of any judicial proceeding), the Administrator (or the State) determines that a permit should not be issued, the temporary permit granted under this paragraph shall be suspended immediately.

(D) The Administrator shall require that certifications under this paragraph be accompanied by a fee sufficient to offset the full administrative costs of reviewing certifications.

(3)(A) In the event that the Administrator fails to promulgate a standard for a category or subcategory of sources by the date established pursuant to subsection (e) (1)(A) or (3), and beginning six months after such date, it shall be unlawful for the owner or operator of any source in such category or subcategory to emit any hazardous air pollutant except in compliance with a permit issued by the Administrator (or a State acting pursuant to a program approved under subsection (l)) under this paragraph.

(B) The permit shall be issued pursuant to the provisions of paragraph (1) and such other provisions as are necessary to carry out the objectives of this Act. In preparing applications for permits under this paragraph, the owner or operator of the source shall commit to the installation and operation of technology and practices to control emissions of hazardous air pollutants which are the best technology and practices available for such source, as certified by an independent, registered professional engineer.

(C) Each permit issued under this paragraph shall include an enforceable emission limitation for each hazardous air pollutant emitted by the source and no such pollutant may be emitted in amounts exceeding the applicable limitation immediately for new sources and, as expeditiously as practicable, but not later than the date three years after the permit is issued for existing sources.

(D) If the Administrator subsequently promulgates a standard which would be applicable in lieu of the emissions limitations established by permit under this section, the Administra-

tor (or the State) shall revise such permit upon the next renewal to reflect the standards promulgated by the Administrator.

(E) Paragraph (2) shall not be available to any source requiring a permit under this paragraph.

(4) The Administrator shall suspend the issuance of permits by the Agency in any State promptly upon approval of a program for that State under subsection (1).

(5)(A) Each State shall transmit to the Administrator a copy of each permit application (but not including certifications for temporary permits) and including any application for an extension or modification submitted under this section, and shall provide for notice of each permit proposed to be issued by the State.

(B) No permit shall be issued if the Administrator within sixty days objects in writing to its issuance as not in compliance with the requirements of this section. The Administrator shall provide with the objection a statement of the reasons for the objection and the terms and conditions that the Administrator would impose if the permit were issued by the Administrator.

(C) If the State fails within ninety days after the date of the objection to submit a permit revised to meet the objection, the Administrator shall have authority to issue or deny the permit.

(D) Nothing in this paragraph shall be interpreted, construed, or applied to require the Administrator to review each permit to be issued by a State, provided that the Administrator conducts an audit program which assures that State permitting activities are consistent with the goals and objectives of this section.

(6) To the maximum extent practicable, permits issued under this section shall be consolidated with other permits required under this Act.

(k) AREA SOURCE PROGRAM.—

(1) The Congress finds that emissions of hazardous air pollutants from area sources may individually, or in the aggregate, present significant risks to public health in urban areas. Considering the large number of persons exposed and the risks of carcinogenic and other adverse health effects from hazardous air pollutants, ambient concentrations characteristic of large urban areas should be reduced to levels substantially below those currently experienced. It is the purpose of this subsection to achieve a substantial reduction in emissions of hazardous air pollutants from area sources and an equivalent reduction in the public health risks associated with such sources including a reduction of not less than 75 per centum in the incidence of cancer attributable to emissions from such sources.

(2) The Administrator shall, after consultation with State and local air pollution control officials, conduct a program of research with respect to sources of hazardous air pollutants in urban areas and shall include within such program—

(A) ambient monitoring for a broad range of hazardous air pollutants (including, but not limited to, volatile organic compounds, metals, pesticides and products of incomplete combustion) in a representative number of urban locations;

(B) analysis to characterize the sources of such pollution with a focus on area sources and the contribution that such

sources make to public health risks from hazardous air pollutants; and

(C) consideration of atmospheric transformation and other factors which can elevate public health risks from such pollutants.

Health effects considered under this program shall include, but not be limited to, carcinogenicity, mutagenicity, teratogenicity, neurotoxicity, reproductive dysfunction, and other acute and chronic effects including the role of such pollutants as precursors of ozone or acid aerosol formation. The Administrator shall report the preliminary results of such research not later than three years after the date of enactment of this paragraph.

(3) Each air pollution control agency receiving a grant under section 105 of this Act, and which has responsibility for a Metropolitan Statistical Area with a population exceeding two hundred and fifty thousand persons shall commence, not later than eighteen months after the date of enactment of this subsection, a monitoring program in each such area to detect and measure the ambient concentration of hazardous pollutants in the air. The Administrator shall, after consultation with the States, prescribe a list of hazardous air pollutants and detection methods (including frequency and location) for purposes of this paragraph which shall reflect those pollutants likely to be emitted by area sources in metropolitan areas and which present the greatest risk to public health. To the extent practicable, monitoring under this paragraph shall be conducted at various times of the day and seasonally and at a variety of locations within each metropolitan area. Each agency required to conduct monitoring shall prepare a biennial report on the results of the monitoring program which shall be made available to the public at a hearing within the metropolitan area and which shall be transmitted to the Administrator. The report shall identify sources or categories of sources contributing to the presence of hazardous pollutants in the air and shall quantify the risks to public health. The Administrator may promulgate such regulations as are necessary to carry out this paragraph, including provisions which—

(A) phase in the monitoring program over a longer period, but not to exceed three years;

(B) provide for a reduction in the frequency of monitoring in areas which have detected low ambient concentrations or health risks in previous monitoring cycles; and

(C) which extend the monitoring program to other areas.

(4)(A) Considering information collected pursuant to the monitoring program authorized by paragraphs (2) and (3), the Administrator shall, not later than five years after the date of enactment of this subsection and after notice and opportunity for public comment, prepare and transmit to the Congress a comprehensive strategy to control emissions of hazardous air pollutants from area sources in urban areas.

(B) The strategy shall (i) identify not less than ten hazardous air pollutants which, as the result of emissions from area sources, present the greatest threat to public health in the largest number of urban areas and which are or will be listed pur-

suant to subsection (b) and (ii) identify the source categories or subcategories emitting such pollutants which are or will be listed pursuant to subsection (c). When identifying categories and subcategories of sources under this subparagraph, the Administrator shall assure that sources accounting for 90 per centum or more of the aggregate emissions of each of the ten identified hazardous air pollutants are subject to standards pursuant to subsection (d) or this subsection.

(C) The strategy shall include a schedule of specific actions to substantially reduce the public health risks posed by the release of hazardous air pollutants from area sources which will be implemented by the Administrator under authority of this or other laws (including, but not limited to, the Toxic Substances Control Act, the Federal Insecticide, Fungicide, and Rodenticide Act, and the Resource Conservation and Recovery Act) or by the States. Requirements applicable to mobile sources or to fuels shall be established pursuant to title II of this Act.

(D) The strategy may also identify research needs in monitoring, analytical methodology, modeling or pollution control techniques and recommendations for changes in law that would further the goals and objectives of this subsection.

(E) Nothing in this subsection shall be interpreted to preclude or delay implementation of actions with respect to area sources of hazardous air pollutants under consideration pursuant to this or any other law and which may be promulgated before the strategy is prepared.

(F) The Administrator shall implement the strategy as expeditiously as practicable assuring that all sources are in compliance with all requirements not later than nine years after the date of enactment of this subsection.

(5) In addition to the national urban air toxics strategy authorized by paragraph (4), the Administrator shall also encourage and support areawide strategies developed by State or local air pollution control agencies which are intended to reduce risks from emissions by areas sources within a particular urban area. From the funds available for grants under this section, the Administrator shall set aside not less than 10 per centum to support areawide strategies addressing hazardous air pollutants emitted by area sources and shall award such funds on a demonstration basis to those States with innovative and effective strategies. At the request of State or local air pollution control officials, the Administrator shall prepare guidelines for control technologies or management practices which may be applicable to various categories or subcategories of area sources.

(6) The Administrator shall report to the Congress at intervals not later than eight and ten years after the date of enactment of this subsection on actions taken under this subsection and other parts of this Act to reduce the risk to public health posed by the release of hazardous air pollutants from area sources. The reports shall also identify specific metropolitan areas which continue to experience high risk to public health as the result of emissions from area sources.

(7) The Administrator shall prepare a report with recommendations on health impacts of mobile source benzene emissions

considering both fuel and vehicle-based control strategies to be submitted to the Environment and Public Works Committee of the Senate and the Energy and Commerce Committee of the House of Representatives not later than twenty-four months after the date of the enactment of the Clean Air Act Amendments of 1989.

(l) State Programs.—

(1) Each State may develop and submit to the Administrator for approval a program for the implementation and enforcement (including a review of enforcement delegations previously granted) of emission standards and other requirements for air pollutants subject to this section or requirements for the prevention and mitigation of sudden, accidental releases pursuant to section 129. A program submitted by a State under this subsection may provide for partial or complete delegation of the Administrator's authorities and responsibilities to implement and enforce emissions standards and prevention requirements but shall not include authority to set standards less stringent than those promulgated by the Administrator under this Act.

(2) Not later than twelve months after the date of enactment of this paragraph, the Administrator shall publish guidance which would be useful to the States in developing programs for submittal under this subsection. Guidance shall, at a minimum, include permitting requirements for new and existing sources of air pollutants subject to this section. The guidance shall also provide for the registration of all facilities producing, processing, handling, or storing any substance listed pursuant to section 129 in amounts greater than the threshold quantity. The Administrator shall include as an element in such guidance an optional program for the review of high-risk point sources of air pollutants including, but not limited to, hazardous air pollutants listed pursuant to subsection (b).

(3) The Administrator shall establish and maintain an air toxics clearinghouse, control technology center and risk information center to provide technical assistance and information to the States and local agencies and, on a cost reimbursable basis, to others on—

(A) measures, methods, practices and techniques effective in reducing emissions of air pollutants subject to this section or section 129;

(B) risk assessment;

(C) ambient monitoring and modeling and emissions measurement and modeling.

The Administrator may conduct research on methods for preventing, measuring and controlling emissions and evaluating associated health and ecological risks. All information collected under this paragraph shall be available to the public.

(4) Upon application of a State, the Administrator may make grants, subject to such terms and conditions as the Administrator deems appropriate, to such State for the purpose of assisting the State in developing and implementing a program for submittal and approval under this subsection. Programs assisted under this paragraph may include program elements addressing air pollutants other than those specifically subject to this sec-

tion or section 129. Grants under this paragraph may include support for high-risk point source review as provided in paragraph (2) and support for the development and implementation of areawide area source programs pursuant to subsection (k).

(5) Not later than one hundred and eighty days after receiving a program submitted by a State, and after notice and opportunity for public comment, the Administrator shall either approve or disapprove such program. The Administrator shall disapprove any program submitted by a State, if the Administrator determines that—

(A) the authorities contained in the program (including conditions in permits) are not adequate to assure compliance by all sources within the State with each applicable standard, regulation, or requirement established by the Administrator under this section;

(B) adequate authority does not exist, or adequate resources (including revenues from permit fees) are not available, to implement the program;

(C) the schedule for implementing the program (including the schedule for issuing permits) and assuring compliance by affected sources is not sufficiently expeditious; or

(D) the program is otherwise not in compliance with the guidance issued by the Administrator under paragraph (2) or is not likely to satisfy, in whole or in part, the objectives of this Act.

If the Administrator disapproves a State program, the Administrator shall notify the State of any revisions or modifications necessary to obtain approval. The State may revise and resubmit the proposed program for review and approval pursuant to the provisions of this subsection.

(6) Whenever the Administrator determines, after public hearing, that a State is not administering and enforcing a program approved pursuant to this subsection in accordance with the guidance published pursuant to paragraph (2) or the requirements of paragraph (5), the Administrator shall so notify the State and, if action which will assure prompt compliance is not taken within ninety days, the Administrator shall withdraw approval of the program. The Administrator shall not withdraw approval of any program unless the State shall have been notified and the reasons for withdrawal shall have been stated in writing and made public.

(7) Nothing in this subsection shall prohibit the Administrator from enforcing any applicable emission standard or requirement under this section or section 129.

(8) The Administrator may after notice and opportunity for public comment approve programs developed and submitted by a local pollution control agency (after consultation with the State) pursuant to this subsection and any such agency implementing an approved program may take any action authorized to be taken by a State under this section.

(m) TECHNICAL ASSISTANCE FOR SMALL SOURCES.—The Administrator (and each State with an approved permit program) shall establish means and measures to supply technical assistance and information to area sources and stationary sources that are not major

sources to help carry out the requirements of this section, including meeting applicable standards and obtaining needed permits. The assistance shall include information availability and types of equipment, measures, methods practices, processes an techniques in reducing emissions of air pollutants and preventing and detecting accidents. The Administrator shall establish and maintain a clearinghouse of such information.

(n) STATE AUTHORITY.—Nothing in this section shall preclude, deny, or limit any right of any State or political subdivision thereof to adopt or enforce any regulation, requirement or standard (including any procedural requirement) which is more stringent than a regulation, requirement, or standard in effect under this section or that applies to a substance not subject to this section. Nothing in this section shall authorize any State to impose any standard, limitation or requirement on the emissions of radionuclides from facilities licensed by the Nuclear Regulatory Commission where such standard, limitation or requirement would be barred by other Federal law including the Atomic Energy Act.

(o) ATMOSPHERIC DEPOSITION TO GREAT LAKES AND COASTAL WATERS.—

(1) The Administrator shall conduct a program to identify and assess the extent of atmospheric deposition of hazardous air pollutants and other air pollutants to the Great Lakes, Lake Champlain and coastal waters. As part of such program, the Administrator shall—

(A) monitor Great Lakes and coastal waters, including monitoring of Great Lakes waters through the monitoring network established pursuant to paragraph (2) of this subsection and designing and deploying an atmospheric monitoring network for coastal waters pursuant to paragraph (4);

(B) investigate the sources and deposition rates of atmospheric deposition of air pollutants (and their atmospheric transformation precursors);

(C) conduct research to develop and improve monitoring methods and to determine the relative contribution of atmospheric pollutants to total pollution loadings to Great Lakes and coastal waters;

(D) evaluate any adverse effects to human health or the environment caused by such deposition (including effects resulting from indirect exposure pathways) and assess the contribution of such deposition to violations of water quality standards established pursuant to the Federal Water Pollution Control Act and drinking water standards established pursuant to the Safe Drinking Water Act; and

(E) sample for such pollutants in biota, fish, and wildlife of Great Lakes, Lake Champlain and coastal waters and characterize the sources of such pollutants.

(2) The Administrator shall oversee, in accordance with Annex 15 of the Great Lakes Water Quality Agreement, the establishment and operation of a Great Lakes atmospheric deposition network to monitor atmospheric deposition of hazardous air pollutants and other air pollutants to the Great Lakes.

(A) As part of the network provided for in this paragraph, and not later than December 31, 1990, the Administrator shall establish in each of the five Great Lakes at least one facility capable of monitoring the atmospheric deposition of hazardous air pollutants in both dry and wet conditions.

(B) The Administrator shall use the data provided by the network to identify and track the movement of hazardous air pollutants through the Great Lakes, to determine the portion of water pollution loadings attributable to atmospheric deposition of such pollutants, and to support development of remedial action plans and other management plans as required by the Great Lakes Water Quality Agreement.

(C) The Administrator shall assure that the data collected by the Great Lakes atmospheric deposition monitoring network is in a format compatible with databases sponsored by the International Joint Commission, Canada, and the several States of the Great Lakes region.

(3) The Administrator shall establish at Lake Champlain an atmospheric deposition station to monitor deposition of hazardous air pollutants and other pollutants within the Lake Champlain watershed. The Administrator shall determine the role of air deposition in the pollutant loadings of Lake Champlain, investigate the sources of air pollutants deposited in the watershed, evaluate the health and environmental effects of such pollutant loadings and shall sample such pollutants in biota, fish and wildlife within the watershed as necessary to characterize such effects.

(4) The Administrator shall design and deploy atmospheric deposition monitoring networks for coastal waters and their watersheds and shall make any information collected through such networks available to the public. As part of this effort, the Administrator shall conduct research to develop and improve deposition monitoring methods, and to determine the relative contribution of atmospheric pollutants to pollutant loadings.

(5) Within two years of the date of enactment of this Act and biennially thereafter, the Administrator shall submit to the Congress a report on the results of any monitoring, studies, and investigations conducted pursuant to this subsection. Such report shall include, at a minimum, an assessment of—

(A) the contribution of atmospheric deposition to pollution loadings in the Great Lakes, Lake Champlain and coastal waters;

(B) the environmental and human health effects of any pollution which is attributable to atmospheric deposition to the Great Lakes, Lake Champlain, and coastal waters;

(C) the source or sources of any pollution to Great Lakes, Lake Champlain, and coastal waters which is attributable to atmospheric deposition;

(D) whether pollution loadings in Great Lakes, Lake Champlain, or coastal waters cause or contribute to violations of drinking water standards pursuant to the Safe

Drinking Water Act or water quality standards pursuant to the Federal Water Pollution Control Act; and

(E) a description of any revisions of the requirements, standards, and limitations pursuant to this Act and other applicable Federal laws as are necessary to assure protection of human health and the environment.

(p) Publicly Owned Treatment Works.—The Administrator may conduct, in cooperation with the owners and operators of publicly owned treatment works, studies to characterize emissions of hazardous air pollutants emitted by such facilities, to identify industrial, commercial and residential discharges which contribute to such emissions and to demonstrate control measures for such emissions. When promulgating any standard under this section applicable to publicly owned treatment works, the Administrator shall consider control measures which include pretreatment of discharges causing emissions of hazardous air pollutants and process or product substitutions or limitations which may be effective in reducing such emissions. The Administrator may prescribe uniform sampling, modeling and risk assessment methods for use in implementing this subsection.

(q) Hydrogen Sulfide.—The Administrator is directed to assess the hazards to public health and the environment resulting from the emission of hydrogen sulfide associated with the extraction of oil and natural gas resources. To the extent practicable, the assessment shall build upon and not duplicate work conducted for an assessment pursuant to section 8002(m) of the Solid Waste Disposal Act and shall reflect consultation with the States. The assessment shall include a review of existing State and industry control standards, techniques, and enforcement. The Administrator shall report to the Congress within twenty-four months of the enactment of this subsection with the findings of such assessment, together with any recommendations, and shall develop and implement a control strategy for emissions of hydrogen sulfide as appropriate to protect human health and the environment, based on the findings of such assessment, using authorities under this Act including section 111 and this section.

(r) Savings Clause.—No amendment to this section made by the Clean Air Act Amendments of 1989 shall affect any emission standard for a hazardous air pollutant which has been promulgated prior to the enactment of such Act. Emissions standards for categories and subcategories of sources of radionuclides for which standards were proposed at 54 Federal Register 9612 (March 7, 1989) except sources which are subject to licensing by the Nuclear Regulatory Commission and including any emission standards for a new subcategory of grate calcination elemental phosphorus plants, shall be established in accordance with section 112 of the Clean Air Act as in effect prior to the enactment of this subsection.

(s) Study of Risk Assessment.—The Administrator shall conduct a review of risk assessment methods used by the Agency to determine the carcinogenic risks associated with exposure to various hazardous air pollutants and source categories and subcategories subject to the requirements of this section and report to the Congress the results of such review not later than twenty-four months after the date of enactment of this subsection. As an element of such

review, the Administrator shall examine the factors which may contribute to overestimating or underestimating such risks, including the exposure parameters used in establishing carcinogenic risk estimates for the most exposed individual. The Administrator shall compare the parameters used in risk assessments for hazardous air pollutants conducted by the Agency with actual conditions of exposure and comparable assumptions made for exposure to other environmental threats and shall seek the views of the National Research Council on such parameters. The Administrator shall include in the report a description of the range of risks, the number of persons exposed at various levels of risk and the cancer incidence for source categories and subcategories which are listed pursuant to subsection (e)(1)(A). The report shall also include a summary of information and methods for assessing the risk of adverse human health effects for pollutants and effects other than carcinogenicity (including, but not limited to, inheritable genetic mutations, birth defects, and reproductive dysfunctions) where no threshold for safe exposure may be determined.

(t) ANNUAL REPORT.—Not later than January 15, 1991, and within one hundred five days of the close of the fiscal year for each fiscal year thereafter, the Administrator shall prepare and transmit to the Congress a comprehensive report on the measures taken by the Agency and by the States to implement the provisions of this section and section 129. The Administrator shall maintain a database on pollutants and sources subject to the provisions of this section and shall include aggregate information from the database, in each annual report. The report shall include, but not be limited to—

(1) a status report on standard-setting under subsections (d), (f), and (g);

(2) information with respect to compliance with such standards including the costs of compliance experienced by sources in various categories and subcategories;

(3) development and implementation of the national urban air toxics program;

(4) recommendations of the Chemical Safety and Hazard Investigation Board with respect to the prevention and mitigation of sudden, accidental releases; and

(5) such recommendations for additional legislation to achieve the purposes of this section and section 129 as the Administrator may deem appropriate.

(u) AUTHORIZATION.—There are authorized to be appropriated such sums as are necessary to carry out the provisions of this section.

FEDERAL ENFORCEMENT

SEC. 113. (a)(1) Whenever, on the basis of any information available to him, the Administrator finds that any person *has violated or* is in violation of any requirement of an applicable implementation plan, the Administrator shall notify the person [in violation of] *who violated* the plan and the State in which the plan applies of such finding. [If such violation extends beyond the 30th day after the date of the Administrator's notification,] *At any time after the expiration of thirty days following the date on which such* *notice of the violation is issued,* the Administrator may issue an order requiring such person to comply with the requirements of such plan, *may issue an administrative penalty order with subsection (d),* or he may bring a civil action in accordance with subsection (b), *without regard to the period of the violation. Nothing in this subsection shall preclude the United States from commencing a criminal action under section 113(c) without such notification for any such violation.*

(2) Whenever, on the basis of information available to him, the Administrator finds that violations of an applicable implementation plan are so widespread that such violations appear to result from a failure of the State in which the plan applies to enforce the plan effectively, he shall so notify the State. If the Administrator finds such failure extends beyond the thirtieth day after such notice, he shall give public notice of such finding. During the period beginning with such public notice and ending when such State satisfies the Administrator that it will enforce such plan (hereafter referred to in this section as "period of federally assumed enforcement"), the Administrator may enforce any requirement of such plan with respect to any person—

(A) by issuing an order to comply with such requirement, [or]

(B) by issuing an administrative penalty order under subsection (d) of this section, or

[(B)] *(C)* by bringing a civil action under subsection (b).

Nothing in this subsection shall preclude the United States from commencing a criminal action under section 113(c) without such notification for any such violation.

(3) Whenever, on the basis of any information available to him, the Administrator finds that any person *has violated or* is in violation of [section 111(e) (relating to new source performance standards), 112(c) (relating to standards for hazardous emissions), or 119(g) (relating to energy-related authorities), or is in violation of any requirement of section 114 (relating to inspections, etc.), he] *any other requirement of this title or title III or IV including, but not limited to, a requirement of any rule, order, waiver or permit promulgated or approved under those titles or for the payment of any fee owed the United States under this Act, the Administrator* may issue an order requiring such person to comply with such section or requirement, [or he] *may issue an administrative penalty order in accordance with subsection (d), or* may bring a civil *or criminal* action in accordance with subsection (b).

(4) An order issued under this subsection (other than an order relating to a violation of section 112) shall not take effect until the person to whom it is issued has had an opportunity to confer with the Administrator concerning the alleged violation. A copy of any order issued under this subsection shall be sent to the State air pollution control agency of any State in which the violation occurs. Any order issued under this subsection shall state with reasonable specificity the nature of the violation, specify a time for compliance which the Administrator determines is reasonable, taking into account the seriousness of the violation and any good faith efforts to comply with applicable requirements. In any case in which an order under this subsection (or notice to a violator under para-

graph (1)) is issued to a corporation, a copy of such order (or notice) shall be issued to appropriate corporate officers. *An order issued under this subsection shall require the person to whom it was issued to comply with the requirement as expeditiously as practicable, but in no event longer than one year after the date the order was issued, and shall be nonrenewable. No order issued under this subsection shall prevent the State or the Administrator from assessing any penalties nor otherwise affect or limit the State or the United States' authority to enforce under other provisions of this Act, nor affect any person's obligations to comply with any section of this Act, or a term or condition of any permit or applicable implementation plan promulgated or approved under this Act.*

[(5) Whenever, on the basis of information available to him, the Administrator finds that a State is not acting in compliance with any requirement of the regulation referred to in section 129(a)(1) of the Clean Air Act Amendments of 1977 (relating to certain interpretative regulations) or any plan provisions required under section 110(a)(2)(I) and part D, he may issue an order prohibiting the construction or modification of any major stationary source in any area to which such provisions apply or he may bring a civil action under subsection (b)(5).]

(5) Whenever, on the basis of any available information, the Administrator finds that a State is not acting in compliance with any requirement of the Act relating to the construction of new sources or the modification of existing sources, the Administrator may—

(A) issue an order prohibiting the construction, modification or operation of any major stationary source in any area to which such provisions apply;

(B) issue an administrative penalty order in accordance with subsection (d); or

(C) bring a civil action under subsection (b)(5).

Nothing in this subsection shall preclude the Administrator from filing a criminal action under section 113(c) at any time for any such violation.

[(b) The Administrator shall in the case of any person which is the owner or operator of a major stationary source, and may, in the case of any other person, commence a civil action for a permanent or temporary injunction, or to assess and recover a civil penalty of not more than $25,000 per day of violation, or both, whenever such person—

[(1) violates or fails or refuses to comply with any order issued under subsection (a); or

[(2) violates any requirement of an applicable implementation plan (A) during any period of Federally assumed enforcement, or (B) more than 30 days after having been notified by the Administration under subsection (a)(1) that such person is violating such requirement; or

[(3) violates section 111(e), 112(c), section 119(g) (as in effect before the date of the enactment of the Clean Air Act Amendments of 1977), subsection (d)(5) (relating to coal conversion), section 320 (relating to cost of certain vapor recovery), section 119 (relating to smelter orders), or any regulation under part B (relating to ozone);

[(4) fails or refuses to comply with any requirement of section 114 or subsection (d) of this section; or

[(5) attempts to construct or modify a major stationary source in any area with respect to which a finding under subsection (a)(5) has been made.

The Administrator may commence a civil action for recovery of any noncompliance penalty under section 120 or for recovery of any nonpayment penalty for which any person is liable under section 120 or for both. Any action under this subsection may be brought in the district court of the United States for the district in which the violation occurred or in which the defendant resides or has his principal place of business, and such court shall have jurisdiction to restrain such violation, to require compliance, to assess such civil penalty and to collect any noncompliance penalty (and nonpayment penalty) owed under section 120. In determining the amount of any civil penalty to be assessed under this subsection, the court shall take into consideration (in addition to other factors) the size of the business, the economic impact of the penalty on the business, and the seriousness of the violation. Notice of the commencement of such action shall be given to the appropriate State air pollution control agency. In the case of any action brought by the Administrator under this subsection, the court may award costs of litigation (including reasonable attorney and expert witness fees) to the party or parties against whom such action was brought in any case where the court finds that such action was unreasonable.]

(b) The Administrator shall, in the case of any person which is the owner or operator of a major emitting facility or a major stationary source, and may, in the case of any other person, commence a civil action for a permanent or temporary injunction, or to assess and recover a civil penalty of not more than $25,000 per day for each violation, or both, whenever such person—

(1) violates any requirement of an applicable implementation plan (such action shall be commenced (A) during any period of federally assumed enforcement, or (B) more than thirty days following the date of the Administrator's notification under subsection (a)(1) of a finding that such person is violating such requirement); or

(2) violates any other requirement of this title, title III, or IV, including a requirement of any rule, order, waiver or permit promulgated or approved under this Act or for the payment of any fee under this Act; or

(3) attempts to construct, modify or operate a major stationary source in any area with respect to which a finding under subsection (a)(5) of this section has been made.

Any action under this subsection may be brought in the district court of the United States for the district in which the violation is alleged to have occurred, or in which the defendant resides, or where the defendant's principal place of business is located, and such court shall have jurisdiction to restrain such violation, to require compliance, to assess such civil penalty, and to collect any fees owed under the Act and any noncompliance assessment and nonpayment penalty owed under section 120 and to award any other appropriate relief. Notice of the commencement of such action shall be *given to the appropriate State air pollution control agency. In the case of any action brought by the Administrator under this subsection, the court may award costs of litigation (including reasonable attorney and expert witness fees) to any party or parties against whom such action was brought in any case where the court finds that such action was unreasonable.*

[(c)(1) Any person who knowingly—

[(A) violates any requirement of an applicable implementation plan (i) during any period of Federally assumed enforcement, or (ii) more than 30 days after having been notified by the Administration under subsection (a)(1) that such person is violating such requirement, or

[(B) violates or fails or refuses to comply with any order under section 119 or under subsection (a) or (d) of this section, or

[(C) violates section 111(e), section 112(c), or

[(D) violates any requirement of section 119(g) (as in effect before the date of the enactment of this Act, subseciton (b)(7) or (d)(5) of section 120 (relating to noncompliance penalties), or any requirement of part B (relating to ozone), shall be punished by a fine of not more than $25,000 per day of violation, or by imprisonment for not more than one year, or by both. If the conviction is for a violation committed after the first conviction of such person under this paragraph, punishment shall be by a fine of not more than $50,000 per day of violation, or by imprisonment for not more than two years, or by both.

[(2) Any person who knowingly makes any false statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under this Act or who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this Act, shall upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than six months, or by both.

[(3) For the purpose of this subsection, the term "person" includes, in addition to the entities referred to in section 302(3), any responsible corporate officer.]

(c) CRIMINAL ENFORCEMENT.—

(1) Any person who knowingly fails to pay any fee owed the United States under this title, title III, or IV, shall, upon conviction, be punished by a fine pursuant to title 18 of the United States Code, or by imprisonment for not more than one year, or by both, per day for each violation. If a conviction of any person under this paragraph is for a violation committed after a first conviction of such person under this paragraph, the maximum punishment shall be doubled with respect to both the fine and imprisonment.

(2) Any person who negligently releases into the air any hazardous air pollutant listed pursuant to section 112 of this Act or any extremely hazardous substance listed pursuant to section 11002(a)(2) of title 42, and who at the time negligently places another person in imminent danger of death or serious bodily injury shall, upon conviction, be punished by a fine under title 18 of the United States Code, or by imprisonment for not more

than one year, or by both, per day for each violation. If a conviction of any person under this paragraph is for a violation committed after a first conviction of such person under this paragraph, the maximum punishment shall be doubled with respect to both the fine and imprisonment.

(3) Any person who knowingly violates any requirement or prohibition of this title, title III, or IV, including but not limited to a requirement or prohibition of any rule, plan, order, waiver or permit promulgated or approved under those titles shall, upon conviction, be punished by a fine pursuant to title 18 of the United States Code, or by imprisonment for not more than five years, or by both, per day for each violation. If a conviction of any person under this paragraph is for a violation committed after a first conviction of such person under this paragraph, the maximum punishment shall be doubled with respect to both the fine and imprisonment.

(4) Any person who knowingly—

(A) makes any false statement, representation, or certification in, or omits material information from or knowingly alters, conceals or fails to maintain or file any notice, application, record, report, plan, or other document filed or required to be maintained or used for purposes of compliance under this Act (whether with respect to the requirements imposed by the Administrator or by a State); or

(B) fails to notify or report as required under this Act; or

(C) falsifies, tampers with, renders inaccurate, or fails to install any monitoring device or method required to be maintained or followed under this Act; shall, upon conviction, be punished by a fine pursuant to title 18 of the United States Code, or by imprisonment for not more than two years, or by both, per day for each violation. If a conviction of any person under this paragraph is for a violation committed after a first conviction of such person under this paragraph, the maximum punishment shall be doubled with respect to both the fine and imprisonment.

(5)(A) Any person who knowingly releases into the air any hazardous air pollutant listed pursuant to section 112 of this Act or any extremely hazardous substance listed pursuant to section 11002(a)(2) of title 42, United States Code, and who knows at the time that he thereby places another person in imminent danger of death or serious bodily injury shall, upon conviction, be punished by a fine under title 18 of the United States Code, or by imprisonment of not more than fifteen years, or by both, per day for each violation. Any person committing such violation who is an organization shall, upon conviction under this paragraph, be subject to a fine of not more than $1,000,000 per day for each violation. If a conviction of any person under this paragraph is for a violation committed after a first conviction of such person under this paragraph, the maximum punishment shall be doubled with respect to both the fine and imprisonment. For any hazardous air pollutant listed pursuant to section 112 for which the Administrator has set an emissions standard, a release of such pollutant shall not consti-

tute a violation of this paragraph unless it exceeds such standard.

(B) In determining whether a defendant who is an individual knew that the violation placed another person in imminent danger of death or serious bodily injury—

> *(i) the defendant is responsibile only for actual awareness or actual belief possessed; and*
>
> *(ii) knowledge possessed by a person other than the defendant, but not by the defendant, may not be attributed to the defendant;*

except that in proving a defendant's possession of actual knowledge, circumstantial evidence may be used, including evidence that the defendant took affirmative steps to be shielded from relevant information.

(C) The term "organization" means a legal entity, other than a government, established or organized for any purpose, and such term includes a corporation, company, association, firm, partnership, joint stock company, foundation, institution, trust, society, union, or any other association of persons.

(D) The term "serious bodily injury" means bodily injury which involves a substantial risk of death, unconsciousness, extreme physical pain, protracted and obvious disfigurement or protracted loss or impairment of the function of a bodily member, organ, or mental faculty.

(6) For the purposes of this subsection, the term "person" includes, in addition to the entities referred to in section 302(e), any responsible corporate officer.

[(d)(1) A State (or, after thirty days notice to the State, the Administrator) may issue to any stationary source which is unable to comply with any requirement of an applicable implementation plan an order which specifies a date for final compliance with such requirement later than the date for attainment of any national ambient air quality standard specified in such plan if—

> [(A) such order is issued after notice to the public (and, as appropriate, to the Administrator) containing the content of the proposed order and opportunity for public hearing;
>
> [(B) the order contains a schedule and timetable for compliance;
>
> [(C) the order requires compliance with applicable interim requirements as provided in paragraph (5)(B) (relating to sources converting to coal), and paragraphs (6) and (7) (relating to all sources receiving such orders) and requires the emission monitoring and reporting by the source authorized to be required under sections 110(a)(2)(F) and 114(a)(1);
>
> [(D) the order provides for final compliance with the requirement of the applicable implementation plan as expeditiously as practicable, but (except as provided in paragraph (4) or (5)) in no event later than July 1, 1979, or three years after the date for final compliance with such requirement specified in such plan, whichever is later; and
>
> [(E) in the case of a major stationary source, the order notifies the source that, unless exempted under section 120(a)(2) (B) or (C), it will be required to pay a noncompliance penalty effective July 1, 1979, as provided under section 120 or by such

later date as is set forth in the order in accordance with section 120 (b)(3) or (g), in the event such source fails to achieve final compliance by July 1, 1976.

[(2) In case of any major stationary source, no such order issued by the State shall take effect until the Administrator determines that such order has been issued in accordance with the requirements of this Act. The Administrator shall determine, not later than 90 days after receipt of notice of the issuance of an order under this subsection with respect to any major stationary source, whether or not any State order under this subsection is in accordance with the requirements of this Act. In the case of any source other than a major stationary source, such order issued by the State shall cease to be effective upon a determination by the Administrator that it was not issued in accordance with the requirements of this Act. If the Administrator so objects, he shall simultaneously proceed to issue an enforcement order in accordance with subsection (a) or an order under this subsection. Nothing in this section shall be construed as limiting the authority of a State or political subdivision to adopt and enforce a more stringent emission limitation or more expeditious schedule or timetable for compliance than that contained in an order by the Administrator.

[(3) If any source not in compliance with any requirement of an applicable implementation plan gives written notification to the State (or the Administrator) that such source intends to comply by means of replacement of the facility, a complete change in production process or a termination of operation, the State (or the Administrator) may issue an order under paragraph (1) of this subsection permitting the source to operate until July 1, 1979, without any interim schedule of compliance: *Provided,* That as a condition of the issuance of any such order, the owner or operator of such source shall post a bond or other surety in an amount equal to the cost of actual compliance by such facility and any economic value which may accrue to the owner or operator of such source by reason of the failure to comply. If a source for which the bond or other surety required by this paragraph has been posted fails to replace the facility, change the production process, or terminate the operations as specified in the order by the required date, the owner or operator shall immediately forfeit on the bond or other surety and the State (or the Administrator) shall have no discretion to modify the order under this paragraph or other surety.

[(4) An order under paragraph (1) of this subsection may be issued to an existing stationary source if—

[(A) the source will expeditiously use new means of emission limitation which the Administrator determines is likely to be adequately demonstrated (within the meaning of section 111(a)(1)) upon expiration of the order,

[(B) such new means of emission limitation is not likely to be used by such source unless an order is granted under this subsection,

[(C) such new means of emission limitation is determined by the Administrator to have a substantial likelihood of—

[(i) achieving greater continuous emission reduction than the means of emission limitation which, but for such order, would be required; or [(ii) achieving an equivalent continuous reduction at lower cost in terms of energy, economic, or nonair quality environmental impact; and

[(D) compliance by the source with the requirement of the applicable implementation plan would be impracticable prior to, or during, the installion of such new means.

Such an order shall provide for final compliance with the requirement in the applicable implementation plan as expeditiously as practicable, but in no event later than five years after the date on which the source would otherwise be required to be in full compliance with the requirement.

[(5) In the case of a major stationary source which is burning petroleum products or natural gas, or both and which—

[(i) is prohibited from doing so under an order pursuant to the provisions of section 2(a) of the Energy Supply and Environmental Coordination Act of 1974 or any amendment thereto, or any subsequent enactment which supersedes such provisions, or

[(ii) within one year after enactment of the Clean Air Act Amendments of 1977 gives notice of intent to convert to coal as its primary energy source because of actual or anticipated curtailment of natural gas supplies under any curtailment plan or schedule approved by the Federal Power Commission (or, in the case of intrastate natural gas supplies, approved by the appropriate State regulatory commission),

and which thereby would no longer be in compliance with any requirement under an applicable implementation plan, an order may be issued by the Administrator under paragraph (1) of this subsection for such source which specifies a date for final compliance with such requirement as expeditiously as practicable, but not later than December 31, 1980. The Administrator may issue an additional order under paragraph (1) of this subsection for such source providing an additional period for such source to come into compliance with the requirement in the applicable implementation plan, which shall be as expeditiously as practicable, but in no event later than five years after the date required for compliance under the preceding sentence.

[(B) In issuing an order pursuant to subparagraph (A), the Administrator shall prescribe (and may from time to time modify) emission limitations, requirements respecting pollution characteristics of coal, or other enforceable measures for control of emissions for each source to which such an order applies. Such limitations, requirements, and measures shall be those which the administrator determines must be complied with by the source in order to assure (throughout the period before the date for final compliance established in the order) that the burning of coal by such source will not result in emissions which cause or contribute to cencentrations of any air pollutant in excess of any national primary ambient air quality standard for such pollutant.

[(C) The Administrator may, by regulation, establish priorities under which manufacturers of continuous emission reduction systems necessary to carry out this paragraph shall provide such systems to users thereof, if he finds, after consultation with the States, that priorities must be imposed in order to assure that such systems are first provided to sources subject to orders under this paragraph in air quality control regions in which national primary ambient air quality standards have not been achieved. No regulation under this subparagraph may impair the obligation of any contract entered into before the date of enactment of the Clean Air Act Amendments of 1977.

[(D) No order issued to a source under this paragraph with respect to an air pollutant shall be effective if the national primary ambient air quality standard with respect to such pollutant is being exceeded at any time in the air quality control region in which such source is located. The preceding sentence shall not apply to a source if, upon submission by any person of evidence satisfactory to the Administrator, the Administrator determines (after notice and public hearing)—

[(i) that emissions of such air pollutant from such source will affect only infrequently the air quality concentrations of such pollutant in each portion of the region where such standard is being exceeded at any time;

[(ii) that emissions of such air pollutant from such source will have only insignificant effect on the air quality concentration of such pollutant in each portion of the region where such standard is being exceeded at any time; and

[(iii) with reasonable statistical assurance that emissions of such air pollutant from such source will not cause or contribute to air quality concentrations of such pollutant in excess of the national primary ambient air quality standard for such pollutant.

[(6) An order issued to a source under this subsection shall set forth compliance schedules containing increments of progress which require compliance with the requirement postponed as expeditiously as practicable.

[(7) A source to which an order is issued under paragraph (1), (3), (4), or (5) of this subsection shall use the best practicable system or systems of emission reduction (as determined by the Administrator taking into account the requirement with which the source must ultimately comply) for the period during which such order is in effect and shall comply with such interim requirements as the Administrator determines are reasonable and practicable. Such interim requirements shall include—

[(A) such measures as the Administrator determines are necessary to avoid an imminent and substantial endangerment to health of persons, and

[(B) a requirement that the source comply with the requirements of the applicable implementation plan during any such period insofar as such source is able to do so (as determined by the Administrator).

[(8) Any order under paragraph (1) of this subsection shall be terminated if the Administrator determines on the record, after notice and hearing, that the inability of the source to comply no longer exists. If the owner or operator of the source to which the order is issued demonstrates that prompt termination of such order would result in undue hardship, the termination shall become effective at the earliest practicable date on which such undue hardship would not result, but in no event later than the date required under this subsection.

[(9) If the Administrator determines that a source to which an order is issued under this subsection is in violation of any requirement of this subsection, he shall—

[(A) enforce such requirement under subsections (a), (b), or (c) of this section,

[(B) (after notice and opportunity for public hearing) revoke such order and enforce compliance with the requirement with respect to which such order was granted,

[(C) give notice of noncompliance and commence action under section 120, or

[(D) take any appropriate combination of such actions.

[(10) During the period of the order in effect under this subsection and where the owner or operator is in compliance with the terms of such order, no Federal enforcement action pursuant to this section and no action under section 304 of this Act shall be pursued against such owner or operator based upon noncompliance during the period the order is in effect with the requirement for the source covered by such order.

[(11) For the purposes of sections 110, 304, and 307 of this Act, any order issued by the State and in effect pursuant to this subsection shall become part of the applicable implementation plan.

[(12) Any enforcement order issued under subsection (a) of this section or any consent decree in an enforcement action which is in effect on the day of enactment of the Clean Air Act Amendments of 1977 shall remain in effect to the extent that such order or consent decree is (A) not inconsistent with the requirements of this subsection and section 119 or (B) the administrative orders on consent issued by the Administrator on November 5, 1975 and February 26, 1976 and requiring compliance with sulfur dioxide emission limitations or standards at least as stringent as those promulgated under section 111. Any such enforcement order issued under subsection (a) of this section or consent decree which provides for an extension beyond July 1, 1979, except such administrative orders on consent, is void unless modified under this subsection within one year after the enactment of the Clean Air Act Amendments of 1977 to comply with the requirements of this subsection.]

(d) Administrative Assessment of Civil Penalties.—

(1) The Administrator may issue an administrative order against any person assessing a civil administrative penalty of up to $25,000, per day for each violation, whenever, on the basis of any available information, the Administrator finds that such person—

(A) violates any requirement of an applicable implementation plan (such order shall be issued (i) during any period of federally assumed enforcement, or (ii) more than thirty days following the date of the Administrator's notification under subsection (a)(1) of this section of a finding that such person is violating such requirement); or

(B) violates any other requirement of this title, title III, or IV, including, but not limited to, a requirement of any rule, order, waiver or permit promulgated or approved

under this Act or for the payment of any fee owed the United States under this Act; or

(C) attempts to construct, modify or operate a major stationary source in any area with respect to which a finding under subsection (a)(5) of this section has been made.

The Administrator's authority under this paragraph shall be limited to matters where the total penalty sought does not exceed $200,000 and the first alleged date of violation occurred no more than twelve months prior to the initiation of the administrative action.

(2)(A) An administrative penalty assessed under paragraph (1) shall be assessed by the Administrator by an order made on the record after opportunity for a hearing in accordance with sections 554 and 556 of title 5 of the United States Code. The Administrator may issue rules for discovery and other procedures for hearings under this paragraph. Before issuing such an order, the Administrator shall give written notice to the person to be assessed an administrative penalty of the Administrator's proposal to issue such order and provide such person an opportunity to request such a hearing on the order, within fifteen days of the date the notice is received by such person.

(B) The Administrator may compromise, modify, or remit, with or without conditions, any administrative penalty which may be imposed under paragraph (d)(1).

(3) The Administrator may implement through regulation, after consultation with the Attorney General, a field citation program for appropriate minor violations, which authorizes the issuance of field citations assessing civil penalties not to exceed $5,000 per day for each violation. Any person to whom a field citation is assessed may, within a reasonable time as prescribed by the Administrator through regulation, elect to pay the penalty assessment or request a hearing on the field citation. If a request for a hearing is not made within the time specified in the regulation, the penalty assessment in the field citation shall be final. Such hearing shall not be subject to section 554 or 556 of title 5 of the United States Code, but shall provide a reasonable opportunity to be heard and to present evidence. Payment of a civil penalty required by a field citation shall not be a defense to further enforcement by the United States or a State to correct a violation, or to assess the statutory maximum penalty pursuant to other authorities in the Act, if the violation continues.

(4) Any person against whom a civil penalty is assessed under this subsection may seek review of such assessment in the United States District Court for the District of Columbia, or for the district in which the violation is alleged to have occurred, in which such person resides, or where such person's principal place of business is located, by filing a notice in such court within thirty days following the date the civil penalty order is issued under paragraph (2), or the final decision in a hearing under paragraph (3) is rendered, and by simultaneously sending a copy of the filing by certified mail to the Administrator and the Attorney General. The Administrator shall promptly file in such court a certified copy, or certified index, as appropriate, of the record on which the order or final decision was issued

within thirty days. Such court shall not set aside or remand such order or final decision unless there is not substantial evidence in the record, taken as a whole, to support the finding of a violation or unless the Administrator's assessment of the penalty constitutes an abuse of discretion. In any such proceedings, the United States may seek to recover civil penalties assessed under this section.

(5) If any person fails to pay an assessment of a civil penalty—

(A) after the order making the assessment or field citation has become final, or

(B) after a court in an action brought under paragraph (4) has entered a final judgment in favor of the Administrator,

the Administrator shall request the Attorney General to bring a civil action in an appropriate district court to recover the amount assessed (plus interest at rates established pursuant to section 6621(a)(2) of title 26, United States Code, from the date of the final order or decision or the date of the final judgment, as the case may be). In such an action, the validity, amount, and appropriateness of such penalty shall not be subject to review. Any person who fails to pay on a timely basis a civil penalty under this section shall be required to pay, in addition to such penalty and interest, the United States' enforcement expenses, including but not limited to attorneys fees and costs incurred by the United States for collection proceedings, and a quarterly nonpayment penalty for each quarter during which such failure to pay persists. Such nonpayment penalty shall be in an amount equal to 20 per centum of the aggregate amount of such person's outstanding penalties and nonpayment penalties accrued as of the beginning of such quarter.

[(e)(1) The Administrator may, in his discretion, in the case of any person which is the owner or operator of a stationary source in an iron- and steel-producing operation not in compliance with the emission limitation requirements of an applicable implementation plan, consent to entry of a Federal judicial decree, or to the modification of an existing Federal judicial decree, with such person establishing a schedule for compliance for such source extending beyond December 31, 1982, but ending not later than December 31, 1985, on the following conditions:

[(A) the Administrator finds, on the basis of information submitted by the applicant and other information available to him, that such extension of compliance is necessary to allow such person to make capital investments in its iron- and steel-producing operations to improve their efficiency and productivity;

[(B) the Administrator finds, on the basis of information submitted by the applicant and other information available to him that an amount equal to the funds the expenditure of which would have been required to comply by December 31, 1982, with those requirements of an applicable implementation plan for which such extensions of compliance are granted and whose expenditure for such purposes are being deferred until after December 31, 1982, pursuant to such extensions will be invested prior to two years from the date of enactment of this subsection in additional capital investments in the iron- and steel-producing operations owned or operated by such person, and located in communities which already contain iron- and steel-producing operations, to improve their efficiency and productivity;

⟦(C) the Administrator and such person consent to entry of Federal judicial decree(s) establishing a phased program of compliance to bring each stationary source at all of such person's iron- and steel-producing operations into compliance with the emission limitation requirements of applicable implementation plans (or, with respect to existing stationary sources located in any nonattainment area for which no implementation plan has been approved as meeting the requirements of part D and subject to implementation plan(s) which do not require compliance with emission limitations which represent at least reasonably available control technology, compliance with emission limitations which represent reasonably available control technology) as expeditiously as practicable but no later than December 31, 1982, or in the case of sources for which extensions of compliance have been granted, no later than December 31, 1985; such decree(s) shall also contain, at a minimum, (i) requirements for interim controls (which may include operation and maintenance procedures); (ii) increments of compliance sufficient to assure compliance by the final compliance deadlines; (iii) requirement(s) that the amount referred to in subparagraph (B) above, is to be invested in projects representing additional capital investments in the iron- and steel-producing operations owned or operated by such person for the purposes specified in such subparagraph and shall contain schedule(s) specifying when each such project (or specified alternative project) is to be commenced and completed, as well as increments of progress toward completion; (iv) stipulated monetary penalties covering completion of the air pollution control projects required by the decree, the projects referred to under (iii) above, and such other items as appropriate; (v) monitoring requirements; (iv) reporting requirements (including provision for periodic reports to be filed with the court); and (vii) provisions for preventing increases of emissions from each stationary source;

⟦(D) the Administrator finds, on the basis of information submitted by the applicant and other information available to him, that such person will have sufficient funds to comply with all applicable requirements by the times set forth in the judicial decree(s) entered into pursuant to subparagraph (C) of this subsection;

⟦(E) the Administrator finds, on the basis of information submitted by the applicant and other information available to him, that the applicant is in compliance with existing Federal judicial decrees (if any) entered under section 113 of this Act applicable to its iron- and steel-producing operations or that any violations of such decrees are de minimus in nature; and

⟦(F) the Administrator finds, on the basis of information submitted by the applicant and other information available to him, that any extension of compliance granted pursuant to this subsection will not result in degradation of air quality during the term of the extension.

[(2) For the purpose of this subsection, "iron- and steel-producing operations" include production facilities for iron and steel, as well as associated processing, coke making and sintering facilities. For the purpose of this subsection, "phased program of compliance" means a program assuring, to the extent possible, that capital expenditures for achieving compliance at all sources owned or operated by such person in iron- and steel-producing operations must be made during the second and each succeeding year of the period covered by the decree(s) in an amount such that at the end of each such year the cumulative expenditures under the decree(s) will be at least equal to the amount which would have been spent if the total expenditures to be made under the decree(s) were made in equal increments during each year of the decree(s). For the purpose of this subsection, "additional capital investments in iron- and steel-producing operations" means investments which the Administrator finds would not be made during the same time period if extension(s) of time for compliance with clean air requirements were not granted under this subsection. The decree entered into pursuant to subparagraph (C) of paragraph (1) of this subsection shall specify the projects which represent additional capital investment in iron- and steel-producing operations, but may also contain specified alternative projects. The decree may also be modified to substitute equivalent projects for these specified. The owner or operator of iron- and steel-producing operations seeking an extension of compliance under this subsection has the burden of satisfying the Administrator with regard to the findings required in paragraphs (A), (B), (D), (E), and (F). A person which is subject to a judicial decree entered or modified pursuant to this subsection shall not be assessed a noncompliance penalty under section 120 of the Act for any source with an extension of compliance under such decree for the period of time covered by the decree only if such source remains in compliance with all provisions and requirements of such decree.

[(3) Any records, reports, or information obtained by the Administrator under this subsection shall be available to the public, except that upon a showing satisfactory to the Administrator by any person that records, reports, or information, or particular part thereof (other than emission data) to which the Administrator has access under this section if made public, is likely to cause substantial harm to the person's competitive position, the Administrator shall consider such record, report, or information or particular portion thereof confidential in accordance with the purposes of section 1905 of title 18 of the United States Code, except that such record, report, or information may be disclosed to other officers, employees, or authorized representatives of the United States concerned with carrying out this Act or when relevant in any proceeding under this Act. Any regulations promulgated under section 114 of this Act apply with equal force to this subsection, subject, however, to any changes that the Administrator shall determine are necessary. This paragraph does not constitute authority to withhold records, reports, or information from the Congress.

[(4) Nothing in this subsection shall preclude or deny the right of any State or political subdivision to enforce any air pollution requirements in any State judicial or administrative forum.

[(5) The provisions of this subsection shall be self-executing, and no implementing regulations shall be required.

[(6) Upon receipt of an application for an extension of time under this subsection with respect to any stationary source the Administrator shall promptly—

[(i) publish notice of such receipt in the Federal Register;

[(ii) notify the Governor of the State in which the Stationary source is located; and

[(iii) notify the chief elected official of the political subdivision in which the source is located.

[(7)(A) The Administrator shall publish in the Federal Register notice of any finding made, or other action taken, by him in connection with the entry of any consent decree or modification of an existing consent decree pursuant to this subsection or in connection with the Administrator's failure or refusal to consent to such a decree.

[(B)(i) Except as provided in clause (ii), any finding or other actions of the Administrator under this subsection with respect to any stationary source, and any failure or refusal of the Administrator to make any such finding or to take any such action under this subsection, shall be reviewable only by a court in which a civil action under section 113 of this Act is brought against the owner or operator of such stationary source.

[(ii) Where, before the date of the enactment of the Steel Industry Compliance Extension Act of 1981, a civil action was brought under this Act against the owner or operator of such stationary source, and any failure or refusal of the Administrator to make any such finding or to take any such action under this subsection, shall be reviewable only by the court in which the civil action was brought.

[(8) The provision of section 304(b)(1)(B) of this Act shall be applicable to this subsection.

[(9) For a source which receives an extension under this subsection, air pollution requirements specified in Federal judicial decrees entered into or modified under this subsection that involves such source may not be modified to extend beyond December 31, 1985.]

(e) PENALTY ASSESSMENT CRITERIA.—

(1) In determining the amount of any penalty to be assessed under this section or section 304(a), the court shall take into consideration (in addition to such other factors as justice may require) the size of the business, the economic impact of the penalty on the business, the violator's compliance history and good faith efforts to comply, the duration of the violation as established by any credible evidence (including evidence other than the applicable test method), payment by the violator of penalties previously assessed for the same violation, the economic benefit of noncompliance, and the seriousness of the violation.

(2) A penalty may be assessed for each day of each violation. For purposes of determining the number of days of violation for which a penalty may be assessed under this section or section

304(a), or an assessment may be made under section 120, the violation shall be deemed to commence on the first provable date of violation and to continue each and every day thereafter until the violator establishes that continuous compliance has been achieved, except to the extent that the violator can prove by a preponderance of the evidence that there were intervening days during which no violation occurred or that the violation was not continuing in nature.

INSPECTIONS, MONITORING, AND ENTRY

SEC. 114. (a) For the purpose (i) of developing or assisting in the development of any implementation plan under section 110 or 111(d), any standard of performance under section 111, [or] any emission standard under section 112, *or any accident prevention regulation under section 129,* (ii) of determining whether any person is in violation of any such standard or any requirement of such a plan, or (iii) carrying out any provision of this Act (except a provision of title II with respect to a manufacturer of new motor vehicles or new motor vehicle engines)—

(1) the Administrator may require any person who owns or operates any emission source or who is subject to any requirement of this Act (other than a manufacturer subject to the provisions of sectoin 206(c) or (208) with respect to a provision of title II, *on a one-time, periodic or continuing basis,* to (A) establish and maintain such records, (B) make such reports, (C) install, use, and maintain such monitoring equipment, *audit procedures,* or methods, (D) sample such emissions (in accordance with such *procedures or* methods, at such locations, at such intervals *during such continuous periods,* and in such manner as the Administrator shall prescribe), [and] *(E) keep periodic or continuous records on control equipment parameters, production variables or other indirect data when direct monitoring of emissions is impractical, (F) submit compliance certifications in accordance with section 114(a)(3); and* [E] *(G)* provide such other information, as he may reasonably require; and

(2) the Administrator or his authorized representative *(including an authorized contractor acting as a representative of the Administrator),* upon presentation of his credentials—

(A) shall have a right of entry to, upon, or through any premises of such person or in which any records required to be maintained under paragraph (1) of this section are located, and

(B) may at reasonable times have access to and copy any records, inspect any monitoring equipment and method required under paragraph (1), and sample any emissions which such person is required to sample under paragraph (1).

(3) The Administrator shall in the case of any person which is the owner or operator of a major stationary source, and may, in the case of any other person, require enhanced monitoring and submission of compliance certifications. Compliance certifications shall include (i) identification of the applicable requirement that is the basis of the certification, (ii) the method used

for determining the compliance status of the source, (iii) the compliance status, (iv) whether compliance is continuous or intermittent, (v) such other facts as the Administrator may require. Compliance certifications and monitoring data shall be public information. Submission of a compliance certification shall in no way limit the Administrator's authorities to investigate or otherwise implement the Act.

* * * * * * *

(c) Any records, reports, or information obtained under subsection (a) shall be available to the public, except that upon a showing satisfactory to the Administrator by any person that records, reports, or information, or particular part thereof, (other than emission data) to which the Administrator has access under this section if made public, would divulge methods or processes entitled to protection as trade secrets of such person, the Administrator shall consider such record, report, or information or particular portion thereof confidential in accordance with the purposes of section 1905 of title 18 of the United States Code. [except that such record, report, or information may be disclosed to other officers, employees, or authorized representatives of the United States concerned with carrying out this Act or when relevant in any proceeding under this Act.] *Any authorized representative of the Administrator (including an authorized contractor acting as a representative of the Administrator) shall be considered an employee of the United States for purposes of the provisions of section 1905 of title 18. Nothing in this subsection shall prohibit the Administrator (including any authorized contractor acting as a representative of the Administrator) from disclosing records, reports or information to other officers, employees or authorized representatives of the United States (including any authorized contractor acting as a representative of the Administrator), or to any State concerned with carrying out this Act, or when relevant in any proceeding under this Act.*

* * * * * * *

CONTROL OF POLLUTION FROM FEDERAL FACILITIES

SEC. 118. (a) Each department, agency, and instrumentality of executive, legislative, and judicial branches of the Federal Government (1) having jurisdiction over any property or facility, or (2) engaged in any activity resulting, or which may result, in the discharge of air pollutants, and each officer, agent, or employee thereof, shall be subject to, and comply with, all Federal, State, interstate, and local requirements, administrative authority, and process and sanctions respecting the control and abatement of air pollution in the same manner and to the same extent as any nongovernmental entity. [The preceding sentence shall apply (A) to any requirement whether substantive or procedural (including any recordkeeping or reporting requirement, any requirement respecting permits and any other requirement whatsoever), (B) to the exercise of any Federal, State, or local administrative authority, and (C) to any process and sanction, whether enforced in Federal, State, or local courts or in any other manner.] *The preceding sentence shall apply (A) to any requirement whether substantive or procedural (in-*

cluding any recordkeeping or reporting requirement, any requirement respecting permits and any other requirement whatsoever), (B) to any requirement to pay a fee or charge imposed by any State or local agency to defray the costs of its air pollution regulatory program, (C) to the exercise of any Federal, State, or local administrative authority, and (D) to any process and sanction, whether enforced in Federal, State, or local courts, or in any other manner. This subsection shall apply notwithstanding any immunity of such agencies, officers, agents, or employees under any law or rule of law. No officer, agent, or employee of the United States shall be personally liable for any civil penalty for which he is not otherwise liable.

(b) The President, may exempt any emission source of any department, agency, or instrumentality in the executive branch from compliance with such a requirement if he determines it to be in the paramount interest of the United States to do so, except that no exemption may be granted from section 111, and an exemption from section 112 may be granted only in accordance with section [112(c).] *112(i)(3).* No such exemption shall be granted due to lack of appropriation unless the President shall have specifically requested such appropriation as a part of the budgetary process and the Congress shall have failed to make available such requested appropriation. Any exemption shall be for a period not in excess of one year, but additional exemptions may be granted for periods of not to exceed one year upon the President's making a new determination. In addition to any such exemption of a particular emission source, the President may, if he determines it to be in the paramount interest of the United States to do so, issue regulations exempting from compliance with the requirements of this section any weaponry, equipment, aircraft, vehicles, or other classes or categories of property which are owned or operated by the Armed Forces of the United States (including the Coast Guard) or by the National Guard of any State and which are uniquely military in nature. The President shall reconsider the need for such regulations at three-year intervals. The President shall report each January to the Congress all exemptions from the requirements of this section granted during the preceding calendar year, together with his reason for granting each such exemption.

* * * * * * *

LISTING OF CERTAIN UNREGULATED POLLUTANTS

SEC. 122. (a) Not later than one year after date of enactment of this section (two years for radioactive pollutants) and after notice and opportunity for public hearing, the Administrator shall review all available relevant information and determine whether or not emissions of radioactive pollutants [(including source material, special nuclear material, and byproduct material),] *(excluding source material, special nuclear material, and byproduct material regulated by the Nuclear Regulatory Commission or by a State which has an agreement with the Commission pursuant to section 274 of the Atomic Energy Act of 1954, as amended),* cadmium, arsenic and polycyclic organic matter into the ambient air will cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health. If the Administrator makes an affirmative determination with respect to any such substance, he shall simultaneously with such determination include such substance in the list published under section 108(a)(1) or 112(b)(1)(A) (in the case of a substance which, in the judgment of the Administrator, causes, or contributes to, air pollution which may reasonably be anticipated to result in an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness), or shall include each category of stationary sources emitting such substance in significant amounts in the list published under section 111(b)(1)(A), or take any combination of such actions.

(b) Nothing in subsection (a) shall be construed to affect the authority of the Administrator to revise any list referred to in subsection (a) with respect to any substance (whether or not enumerated in subsection (a)).

[(c)(1) Before listing any source material, special nuclear, or byproduct material (or component or derivative thereof) as provided in subsection (a), the Administrator shall consult with the Nuclear Regulatory Commission.

[(2) Not later than six months after listing any such material (or component or derivative thereof) the Administrator and the Nuclear Regulatory Commission shall enter into an interagency agreement with respect to those sources or facilities which are under the jurisdiction of the Commission. This agreement shall, to the maximum extent practicable consistent with this Act, minimize duplication of effort and conserve administrative resources in the establishment, implementation, and enforcement of emission limitations, standards of performance, and other requirements and authorities (substantive and procedural) under this Act respecting the emission of such material (or component or derivative thereof) from such sources or facilities.

[(3) In case of any standard or emission limitation promulgated by the Administrator, under this Act or by any State (or the Administrator) under any applicable implementation plan under this Act, if the Nuclear Regulatory Commission determines, after notice and opportunity for public hearing that the application of such standard or limitation to a source or facility within the jurisdiction of the Commission would endanger public health or safety, such standard or limitation shall not apply to such facilities or sources unless the President determines otherwise within ninety days from the date of such finding.]

* * * * * * *

INTERSTATE POLLUTION ABATEMENT

SEC. 126. (a) Each applicable implementation plan shall—

(1) require each major proposed new (or modified) source—

(A) subject to part C (relating to significant deterioration of air quality) or

(B) which may significantly contribute to levels of air pollution [in excess of the national ambient air quality standards] in any air quality control region outside the State in which such source intends to locate (or make such modification), to provide written notice to all nearby States the air pollution levels of which may be affected by such source at least sixty days prior to the date on which commencement of construction is to be permitted by the State providing notice, and

(2) identify all major existing stationary sources which may have the impact described in paragraph (1) with respect to new or modified sources and provide notice to all nearby States of the identity of such sources not later than three months after the date of enactment of the Clean Air Act Amendments of 1977.

(b) Any State or political subdivision may petition the Administrator for a finding that any major source *or group of sources,* emits or would emit any air pollutant in violation of the prohibition of section **[**110(a)(2)(E)(i).**]** *110(c)(4) or this section.* Within 60 days after receipt of any petition under this subsection and after public hearing, the Administrator shall make such a finding or deny the petition.

(c) Notwithstanding any permit which may have been granted by the State in which the source is located (or intends to locate), it shall be a violation of *this section and* the applicable implementation plan in such State—

(1) for any major proposed new (or mofidied) source with respect to which a finding has been made under subsetion (b) to be constructed or to operate in violation of the prohibition of section **[**110(a)(2)(E)(i),**]** *110(c)(4) or this section,* or

(2) for any major existing source to operate more than three months after such finding has been made with respect to it.

The Administrator may permit the continued operation of a source referred to in paragraph (2) beyond the expiration of such three-month period if such source complies with such emission limitations and compliance schedules (containing increments of progress) as may be provided by the Administrator to bring about compliance with the requirements contained in section 110(a)(2)(E)(i) as expeditiously as practicable, but in no case later than three years after the date of such finding. Nothing in the preceding sentence shall be construed to preclude any such source from being eligible for an enforcement order under section 113(d) after the expiration of such period during which the Administrator has permitted continuous operation.

(d) Emissions of air pollutant which, by itself or in combination, reaction, or transformation, adversely affects the public health or welfare of another State, is a violation of this section.

* * * * * * *

PREVENTION OF SUDDEN, ACCIDENTAL RELEASES

SEC. 129. (a) PURPOSE AND GENERAL DUTY.—It shall be the objective of the regulations and programs authorized under this section to prevent the sudden, accidental release and to minimize the consequences of any such release of any substance listed pursuant to subsection (c) or any other extremely hazardous substance. The owners and operators of facilities producing, processing, handling, or storing such substances have a general duty to identify hazards resulting from such releases using appropriate hazard assessment tech-

niques, to design and maintain a safe facility taking such steps as are necessary to prevent releases, and to minimize the consequences of sudden, accidental releases which do occur. Nothing in this subsection shall be interpreted, construed, or applied to create any liability for compensation for bodily injury or property damages to any person which may result from sudden, accidental releases of such substances.

(b) DEFINITIONS.—

(1) The term "accidental release" means the direct or indirect introduction of an extremely hazardous substance into the air under circumstances which are not routine and which are not authorized pursuant to any permit or emission limitation or standard under any other provision of this Act or any other Federal law.

(2) The term "facility" means all buildings, structures, equipment, installations or substance emitting stationary activities or any other point or nonpoint source of a release. The term 'facility' does not include the right-of-way of a railroad outside of any railroad yard.

(c) LIST OF SUBSTANCES.—The Administrator shall, not later than twelve months after the date of enactment of this section, propose and, not later than twenty-four months after such date, promulgate, a list of not less than fifty substances which may, as the result of sudden events, be released in concentrations that may reasonably be anticipated to cause acute adverse health effects in humans. The list shall be drawn from, but not be limited to, those substances on the list established by section 302 of the Emergency Planning and Community Right-to-Know Act of 1986 and shall include those substances with the greatest likelihood to cause death, injury, property damage, or evacuations as the result of sudden, accidental releases. The initial list shall include sulfuric acid, chlorine, anhydrous ammonia, hydrochloric acid, methyl chloride, ethylene oxide, toluene, vinyl chloride, methyl alcohol, nitric acid (94 per centum by weight or more HNO_3*), styrene, tetrachloroethylene, ammonia, hydrogen sulfide, acetone, methylene chloride, benzene, methyl ethyl ketone, toluene diisocyanate, phosgene, sulfur dioxide (10 per centum or more by volume), formaldehyde (gas), butadiene, hydrofluoric acid, and acrylonitrile. The Administrator shall from time to time (but not less often than every five years) review and revise the list established by this subsection adding substances which, as a result of sudden events, may be released in concentrations that may reasonably be anticipated to cause acute adverse health effects in humans. At the time any substance is placed on such list, the Administrator shall establish a threshold quantity for such substance, taking into account the toxicity (including short- and long-term health effects), reactivity, volatility, dispersibility, combustibility, or flammability of the substance.*

(d) HAZARD ASSESSMENTS.—

(1) Not later than twelve months after a substance is listed under subsection (c), the owner or operator of each facility at which such substance is present in amounts greater than the threshold quantity shall conduct and complete a hazard assessment for each such substance present at the facility. The purpose of such assessment shall be to anticipate the consequences

of a range (including worst case events) of sudden, accidental releases of such substances from the facility and to provide information that may aid in the prevention, or mitigation, of or response to such releases.

(2) Not later than twelve months after the date of enactment of this subsection the Administrator shall propose and not later than twenty-four months after such date publish guidance with respect to the preparation of hazard assessments. In preparing such guidance the Administrator shall review and require, as appropriate, each of the following elements—

(A) basic data on the facility, units at the facility which contain or process substances listed under subsection (c) (including the longitude and latitude of such units), facility operating procedures, population of the nearby communities, and the meteorology of the area where the facility is located;

(B) an identification of the potential sources of sudden, accidental release from the facility of substances listed under subsection (c);

(C) an identification of any previous such releases from the facility for which a report was required under this or other laws, including the amounts released, frequencies, and durations;

(D) an identification of a range (including worst case events) of potential releases from the facility including an estimate of the size, concentration, and duration of such potential releases and a correlation of such factors with the distance from the source of release;

(E) a determination of potential exposure (including the concentration and duration of exposure) for all persons who may be put at risk as the result of a sudden, accidental release from the facility;

(F) a determination of the probability of exposure as the result of various release scenarios including consideration of meteorological factors;

(G) information on the toxicity of the substances listed under subsection (c) present at the facility;

(H) a review of the efficacy of various release prevention and control measures; and

(I) a sensitivity analysis with respect to the uncertainties and assumptions incorporated in the hazard assessment.

(3) Each hazard assessment prepared pursuant to this subsection shall be updated biennially. Hazard assessments shall not be required to include potential releases from rolling stock infrequently and temporarily located at the facility but may be required to consider hazards with respect to the substances contained in rolling stock which are regularly present.

(4) To the maximum extent practicable, the Administrator shall coordinate requirements for hazard assessments under this section with any comparable requirements that may be imposed by the Occupational Safety and Health Administration including joint promulgation of regulations: Provided, That, impacts of potential releases on human health and property outside the boundary of the facility are fully considered in any

such regulation, that hazard assessments are available to the public as provided in this subsection, and that nothing in such regulation is interpreted, construed, or applied to preclude or diminish the right of any State or a political subdivision thereof to impose requirements for hazard assessment or accident prevention and mitigation more stringent than those established under such regulations.

(5) To the extent practicable, and where there are a large number of small facilities with similar business and operating characteristics which are likely to present similar risks of sudden, accidental releases of extremely hazardous substances, the Administrator shall facilitate compliance with the requirements of this subsection by designing generic hazard identification and assessment tools including training manuals, checklists, and workbooks which would be useful to the owners and operators of such facilities. The Administrator is authorized to cooperate with trade associations and other organizations representing such facilities and other advisory groups to develop hazard identification and assessment materials and to conduct training programs in the use of such materials.

(6) Hazard assessments prepared pursuant to the requirements of this subsection shall be available to the Administrator, to the Chemical Safety and Hazard Investigation Board, to the State in which the facility is located, to any local emergency planning entity or public safety agency having responsibility for planning or response with respect to sudden, accidental releases which may occur at such facility, and to the public subject to the conditions of sections 322, 323, and 324 of the Emergemcy Planning and Community Right-to-Know Act of 1986.

(7) As a part of the guidance published pursuant to paragraph (2), the Administrator may collect and publish information on accident scenarios and consequences covering a range of possible events for substances listed under subsection (c). The Administrator shall establish a program of long-term research to develop and disseminate information on methods and techniques of hazard assessment which may be useful in improving and validating the procedures employed in the preparation of hazard assessments under this subsection.

(e) CHEMICAL SAFETY BOARD.—

(1) There is hereby established within the Environmental Protection Agency an independent safety board to be known as the Chemical Safety and Hazard Investigation Board.

(2) The Board shall consist of three members, including a chairperson, who shall be appointed by the President, by and with the advice and consent of the Senate. Members of the Board shall be appointed on the basis of technical qualification, professional standing, and demonstrated knowledge in the fields of accident reconstruction, safety engineering, human factors, chemical safety, toxicology, or chemical regulation.

(3) The terms of office of members of the Board shall be five years. Any member of the Board, including the chairperson, as determined by the President, may be removed for inefficiency, neglect of duty, or malfeasance in office.

(4) The chairperson shall be the chief executive officer of the Board and shall exercise the executive and administrative functions of the Board including the selection, appointment and compensation of such officers and employees as are necessary to carry out the functions of the Board.

(5) The Board shall—

(A) investigate (or cause to be investigated), determine and report to the public in writing the facts, conditions, and circumstances and the cause or probable cause of any sudden, accidental release involving the production, processing, handling, or storage of chemical substances resulting in a fatality, serious injury, or substantial property damages;

(B) issue periodic reports to the Congress, Federal, State, and local agencies, including the Environmental Protection Agency and the Occupational Safety and Health Administration, concerned with the safety of chemical production, processing, handling and storage, and other interested persons recommending measures to reduce the likelihood or the consequences of sudden, accidental release and proposing corrective steps to make chemical production, processing, handling, and storage as safe and free from risk of injury as is possible and may include in such reports proposed rules or orders which should be issued by the Administrator under the authority of this section or the Secretary of Labor under the Occupational Safety and Health Act to prevent or minimize the consequences of any release of substances that may have an acute adverse effect on human health as a result of sudden events; and

(C) establish by regulation requirements binding on persons for reporting accidental releases subject to the Board's investigatory jurisdiction under this paragraph: Provided, That, reporting releases to the National Response Center, in lieu of the Board directly, shall satisfy such regulations: And provided further, That, the Center shall promptly notify the Board of any releases which are within the Board's jurisdiction.

(6) The Board shall coordinate its actions under paragraph (5) with investigations and studies conducted by other agencies of the United States having a responsibility to protect public health and safety, but in no event shall the Board forego an investigation where a sudden, accidental release involving the production, processing, handling, or storage of a chemical substance causes a fatality or serious injury among the general public. The Board shall enter into a memorandum of understanding with the National Transportation Safety Board to assure coordination of functions and to limit duplication of activities which shall designate the National Transportation Safety Board as the lead agency for the investigation of releases which are transportation related.

(7) The Board is authorized to conduct research and studies with respect to the potential for the sudden, accidental release of substances subject to section 302 of the Emergency Planning and Community Right-to-Know Act of 1986 and other extremely

hazardous substances, whether or not an accidental release has occurred, where there is evidence which indicates the presence of a potential hazard or hazards. To the extent practicable, the Board shall conduct such studies in cooperation with other Federal agencies having emergency response authorities, State and local governmental agencies and associations and organizations from the industrial, commercial, and nonprofit sectors.

(8) No part of the conclusions, findings, or recommendations of any report of the Board relating to any accidental release or the investigation thereof shall be admitted as evidence or used in any action or suit for damages arising out of any matter mentioned in such report.

(9) Not later than eighteen months after the date of enactment of this section, the Board shall publish a report accompanied by recommendations to the Administrator on the use of hazard assessments in preventing the occurrence and minimizing the consequences of sudden, accidental releases of extremely hazardous substances. The recommendations shall include a list of extremely hazardous substances (including threshold quantities for such substances) and categories of facilities for which hazard assessments would be an appropriate measure to aid in the prevention of accidental releases and to minimize the consequences of those releases that do occur. The recommendations shall also include a description of the information and analysis which would be appropriate to include in any hazard assessment. The Board shall also make recommendations with respect to the role of risk management plans as provided for in subsection (f)(2) in preventing accidental releases. The Board may from time to time review and revise its recommendations under this paragraph.

(10) Whenever the Board submits a recommendation with respect to the safety of chemical production, processing, handling, and storage to the Administrator, the Administrator shall respond to such recommendation formally and in writing not later than one hundred and eighty days after receipt thereof. The response to the Board's recommendation by the Administrator shall indicate whether the Administrator will—

(A) initiate a rulemaking or issue such orders as are necessary to implement the recommendation in full or in part, pursuant to any timetable contained in the recommendation;

(B) decline to initiate a rulemaking or issue orders as recommended.

Any determination by the Administrator not to implement a recommendation of the Board or to implement a recommendation only in part, including any variation from the schedule contained in the recommendation, shall be accompanied by a statement from the Administrator setting forth the reasons for such determination.

(11) The Board, or upon authority of the Board, any member thereof, any administrative law judge employed by or assigned to the Board, or any officer or employee duly designated by the Board, may for the purpose of carrying out duties authorized by paragraph (5)(A)—

(A) hold such hearings, sit and act at such times and places, administer such oaths, and require by subpoena or otherwise attendance and testimony of such witnesses and the production of evidence and may require by order that any person engaged in the production, processing, handling, or storage of chemical substances submit written reports and responses to requests and questions within such time and in such form as the Board may require; and

(B) upon presenting appropriate credentials and a written notice of inspection authority, enter any property where a sudden, accidental release causing a fatality, serious injury or substantial property damage has occurred and do all things therein necessary for a proper investigation pursuant to paragraph (5)(a) and inspect at reasonable times records, files, papers, processes, controls, and facilities and take such samples as are relevant to such investigation.

(12) The Board is authorized to establish such procedural and administrative rules as are necessary to the exercise of its functions and duties. The Board is authorized without regard to section 5 of title 41 of the United States Code to enter into contracts, leases, cooperative agreements or other transactions as may be necessary in the conduct of the duties and functions of the Board with any other agency, institution, or person.

(13) The Administrator shall provide to the Board such support and facilities as may be necessary for operation of the Board.

(14) Any records, reports, or information obtained by the Board shall be available to the public, except that upon a showing satisfactory to the Board by any person that records, reports, or information, or particular part thereof (other than release or emissions data) to which the Board has access, if made public, is likely to cause substantial harm to the person's competitive position, the Board shall consider such record, report, or information or particular portion thereof confidential in accordance with section 1905 of title 18 of the United States Code, except that such record, report, or information may be disclosed to other officers, employees, and authorized representatives of the United States concerned with carrying out this Act or when relevant under any proceeding under this Act. This paragraph does not constitute authority to withhold records, reports, or information from the Congress.

(15) Whenever the Board submits or transmits any budget estimate, budget request, supplemental budget request, or other budget information, legislative recommendation, prepared testimony for congressional hearings, recommendation or study to the President, the Administrator, or the Director of the Office of Management and Budget, it shall concurrently transmit a copy thereof to the Congress. No officer or agency of the United States shall have authority to require the Board to submit its budget requests or estimates, legislative recommendations, prepared testimony, comments, recommendations or reports to any officer or agency of the United States for approval or review prior to the submission of such recommendations, testimony, comments or reports to the Congress. In the performance of their

functions as established by this Act, the members, officers and employees of the Board shall not be responsible to or subject to supervision or direction of any officer or employee or agent of any other part of the Environmental Protection Agency or any other agency of the United States except that the President may remove any member of the Board for inefficiency, neglect of duty or malfeasance in office.

(16) The Board shall submit an annual report to the President and to the Congress which shall include, but not be limited to, information on sudden, accidental releases which have been investigated by or reported to the Board during the previous year, recommendations for legislative or administrative action which the Board has made, the actions which have been taken by the Administrator or the heads of other agencies to implement such recommendations, an identification of priorities for study and investigation in the succeeding year, progress in the development of risk-reduction technologies and the response to and implementation of significant research findings on chemical safety in the public and private sector.

(17) There are authorized to be appropriated to carry out the provisions of this subsection not to exceed $12,000,000 in each of the fiscal years ending September 30, 1990, 1991, 1992, 1993, and 1994.

(f) ACCIDENT PREVENTION.—(1) In order to prevent the release of substances listed pursuant to subsection (c) or other extremely hazardous substances (which may cause acute adverse effects on human health as the result of sudden events) from devices and systems (including, but not limited to, pumps, compressors, valves, flanges, connectors, containers, and vessels but not including rolling stock), the Administrator shall promulgate release prevention, detection, and correction requirements which shall include monitoring, recordkeeping, reporting, training, vapor recovery, secondary containment, and other design, equipment, work practice, and operational requirements. Regulations promulgated under this subsection may make distinctions between various types, classes, and kinds of facilities, devices, and systems taking into consideration factors including, but not limited to, the size, location, process, process controls, quantity of substances handled, potency of substances, and response capabilities present at any facility.

(2) The regulations under this subsection may require the owner or operator of any facility handling an extremely hazardous substance to prepare and implement a risk management plan to detect and prevent or minimize the potential for an accidental release of extremely hazardous substances and to provide prompt emergency response in the event of a release. The Administrator may require that such plans be reviewed by an independent engineer and that any deficiencies identified be corrected.

(3) In carrying out the authority of this subsection, the Administrator shall consult with the Secretary of Labor and seek to coordinate any requirements under this subsection with any requirements established for comparable purposes by the Occupational Safety and Health Administration. Nothing in this section shall be interpreted, construed, or applied to impose requirements affecting, or to grant the Administrator, the Chemical Safety and Hazard Investigation

Board, or any other agency any authority to regulate (including requirements for hazard assessment), the accidental release of radionuclides arising from the construction and operation of facilities licensed by the Nuclear Regulatory Commission.

(g) Detection.—Regulations promulgated pursuant to subsection (f) shall include requirements for monitoring of all devices and systems (including, but not limited to pumps, compressors, valves, flanges, pipes, and pipelines, connectors, processes, containers and vessels), storage facilities, and transfer points adequate to detect immediately and report concurrently to the facility operator accidental releases of such substances from covered facilities.

(h) Order Authority.—

(1) In addition to any other action taken, when the Administrator determines that there may be an imminent and substantial endangerment to the public health or welfare or the environment because of an actual or threatened release of a substance listed pursuant to subsection (c) or other extremely hazardous substance from a facility, the Administrator may secure such relief as may be necessary to abate such danger or threat, and the district court of the United States in the district in which the threat occurs shall have jurisdiction to grant such relief as the public interest and the equities of the case may require. The Administrator may also, after notice to the State in which the facility is located, take other action under this subsection including, but not limited to, issuing such orders as may be necessary to protect human health, welfare, or the environment.

(2) Any person who willfully violates, or fails or refuses to comply with, any order of the Administrator under paragraph (1) may, in an action brought in the appropriate United States district court to enforce such order, be fined not more than $25,000 for each day in which such violation occurs or failure to comply continues.

(3) Within one hundred and eighty days after enactment of this section, the Administrator shall publish guidance for using the order authorities established by this subsection. Such guidance shall provide for the coordinated use of the authorities of this subsection with other emergency powers authorized by section 106 of the Comprehensive Environmental Response, Compensation, and Liability Act, sections 311(c), 308, 309, and 504(a) of the Federal Water Pollution Control Act, sections 3007, 3008, 3013, and 7003 of the Solid Waste Disposal Act, sections 1445 and 1431 of the Safe Drinking Water Act, sections 5 and 7 of the Toxic Substances Control Act, and sections 113, 114, and 303 of this Act.

(i) Enforcement.—Each requirement under this section shall, for purposes of section 113, 114, 116, 304 and 307, be treated as a standard in effect under section 112.

(j) Presidential Review.—The President shall conduct a review of release prevention, mitigation, and response authorities of the various Federal agencies and shall clarify and coordinate agency responsibilities to assure the most effective and efficient implementation of such authorities and to identify any deficiencies in authority or resources which may exist. The President may utilize the re-

sources and solicit the recommendations of the Board in conducting such review. At the conclusion of such review, but not later than twenty-four months after the date of enactment of this section, the President shall transmit a message to the Congress on the release prevention, mitigation, and response activities of the Federal Government making such recommendations for change in law as the President may deem appropriate. Nothing in this subsection shall be interpreted, construed, or applied to authorize the President to modify or reassign release prevention, mitigation, or response authorities otherwise established by law.

(k) STATE AUTHORITY.—Nothing in this section shall preclude, deny, or limit any right of a State or political subdivision thereof to adopt or enforce any regulation, requirement, or standard (including any procedural requirement) that is more stringent than a regulation, requirement, or standard in effect under this section or that applies to a substance not subject to this section.

(l) AUTHORIZATION.—There are authorized to be appropriated to the Administrator such sums as may be necessary to carry out the provisions of this section.

MUNICIPAL WASTE COMBUSTION

SEC. 130. (a) STANDARDS FOR NEW UNITS.—(1)(A) Not later than eighteen months after the date of enactment of this section, the Administrator shall promulgate standards of performance to control emissions of air pollutants into the ambient air from each—

(i) new or modified municipal waste incineration unit; and

(ii) municipal waste incineration unit which begins operation after July 1, 1989, except units which are substantially completed before such date.

(B) The standards promulgated under this subsection shall reflect the greatest degree of emission limitation achievable through application of the best available control technologies and practices which the Administrator determines at the time of promulgation (or revision, in the case of a revision of a standard)—

(i) has been achieved in practice by a municipal waste incineration unit, excluding periods of malfunction or misoperation, or

(ii) is contained in a State or local regulation or any permit for municipal waste incineration units, and will be implemented at such units,

whichever is more stringent, unless the Administrator determines that such degree of emission limitation will not be achievable by units to which the standards apply or was adopted for reasons that are unique to the unit or jurisdiction in which the unit is located and are not applicable to other units or jurisdictions. In determining the emissions limitation to be required under this subsection, the Administrator shall take into account the performance of all units which achieve, in whole or in part, emissions limitations more stringent than current standards and may subsequently exclude units from consideration only to the extent provided in this subparagraph. In establishing standards under this section the Administrator may distinguish between types and classes of municipal *waste incineration units based on combustion technology or pollution control systems.*

(C) In no event shall the standards promulgated under this subsection permit such municipal waste incineration units to emit any pollutant in excess of the amount allowable under any applicable new source standards of performance.

(D) Standards under this subsection shall be based on methods and technologies for removal or destruction of pollutants before, during, or after combustion, and shall incorporate siting requirements that minimize, on a site specific basis, to the maximum extent practicable, any potential risk to human health or the environment. The following practices and control technologies, used individually, in combination with one another, or in combination with other available practices or control technologies not identified in this paragraph, shall be deemed available for purposes of this paragraph: electrostatic precipitators, fabric filtration, flue gas scrubbers, spray dry scrubbers, negative air flow, and good combustion practices, including availability of auxiliary fuel to maintain specific temperatures.

(E) In adopting standards of performance, the Administrator may take into consideration other technologies and practices that, either by themselves or in combination with other technologies or practices, may achieve a greater degree of emission reduction for the pollutants specified in paragraph (2)(A), including the use of selective or non-selective catalytic reduction, wet flue gas denitrification, selective noncatalytic reduction, wet scrubbing, or catalytic oxidation.

(2)(A) The standards promulgated under this subsection shall specify numerical emission limitations for the following substances or mixtures: particulate matter (total and fine), opacity, sulfur dioxide, hydrogen chloride, oxides of nitrogen, carbon monoxide, lead, cadmium, mercury, halogenated organic compounds, dioxins, and dibenzofurans. In establishing such standards of performance under this subsection, the Administrator shall take into account the use of numerical standards or other methods to reduce the presence in air emissions or ash from a municipal waste incineration unit of each of the following additional substances: volatile organic compounds, beryllium, hydrogen fluoride, antimony, arsenic, barium, chromium, cobalt, copper, nickel, selenium, zinc, polychlorinated biphenyls, chlorobenzenes, chlorophenols, and polynuclear aromatic hydrocarbons.

(B) Except as provided in subparagraph (C), any such standard shall not allow—

(i) an outlet gas carbon monoxide concentration greater than 50 parts per million corrected to 7 percent oxygen on a 8-hour average except that the Administrator is authorized to establish a standard for refuse-derived fuel units allowing carbon monoxide concentrations not to exceed 100 parts per million corrected to 7 percent oxygen on a 8-hour average if such units commencing construction or modification after the date of enactment of this section control emissions with dry scrubbers and fabric filtration;

(ii) an outlet gas particulate concentration greater than 0.015 grains per dry standard cubic foot corrected to 7 percent oxygen;

(iii) an outlet gas concentration of sulfur dioxide greater than 40 parts per million corrected to 7 percent oxygen on an 8-hour average, unless uncontrolled emissions of sulfur dioxide are reduced by not less than 70 percent;

(iv) an outlet gas concentration of hydrogen chloride greater than 30 parts per million corrected to 7 percent oxygen, unless uncontrolled hydrogen chloride emissions are reduced by not less than 90 percent;

(v) a retention temperature and time of less than 1800 degrees Fahrenheit or less than 1 second at fully mixed height (or the equivalent), except that the Administrator may establish standards for combustion parameters (including temperature) other than those stated in this paragraph for units employing atmospheric-fluidized bed boilers for the control of oxides of nitrogen, if such standards achieve a combustion efficiency equivalent to that required of other units; or

(vi) a flue gas temperature of 450 degrees Fahrenheit or more averaged over 4 hours at the inlet of the particulate control device.

(C) The Administrator shall by regulation establish periods of unit startup, unit shutdown and process upset to which the requirements of subparagraph (B)(i) do not apply and shall establish alternative standards during such period which shall include numerical limitations for carbon monoxide emissions and a requirement to use auxiliary fuels to minimize emissions of such pollutant.

(3) Standards promulgated under this subsection shall be effective no later than six months after the date of promulgation. To the extent that installation of an acid gas scrubber at a municipal waste incineration unit is required to comply with a standard or standards under this subsection, such standard shall be effective for units at which a scrubber is to be installed not later than twenty-four months after the date of promulgation. Not later than five years following the initial promulgation of such standards and at five-year intervals thereafter, the Administrator shall review and, in accordance with this subsection, revise such standards. Such revised standards shall be effective as of the date six months after the date of promulgation with respect to facilities which begin construction or modification on or after the date on which such standards are first proposed.

(4) After the effective date of any standard promulgated under this section, it shall be unlawful for any owner or operator of any municipal waste incineration unit to operate such unit in violation of such standard applicable to such unit.

(5) When promulgating standards (or revised standards) under this subsection the Administrator shall consider the applicability of such standards (as the result of subsection (k)(2)(B)) to municipal waste incineration units already in operation and shall publish with such standards a schedule for compliance for each such unit providing adequate time for retrofit of necessary pollution control equipment, but in no event longer than four years after the date such standards are promulgated.

(b) RECYCLING AND ASH MANAGEMENT.—(1) In addition to any other applicable requirements, after the date thirty-six months after the enactment of this section, no permit may be issued under a State

program approved under part C or part D of this Act for any new or modified municipal waste incineration unit unless (A) the applicant has fully complied with the application requirements for the permit (pursuant to 40 CFR 52.21) and any applicable State requirements before such date, or (B) each of the jurisdictions served by the municipal waste incineration unit (as designated by the State in accordance with section 4006 of the Solid Waste Disposal Act) has been certified by the director of the solid waste program for the State in which the unit is to be located as in compliance with all solid waste planning requirements under the Solid Waste Disposal Act and will achieve pursuant to an enforceable plan a solid waste recycling rate of 25 per centum or more before such unit begins operation, unless the director determines that recycling at such rate is economically infeasible and establishes an alternative rate. Yard waste shall not be credited for more than 10 per centum of the waste stream for purposes of the recycling requirement under this paragraph.

(2)(A) Beginning twenty-four months after the date of enactment of this section, no permit may be issued under this Act to a municipal waste incineration unit unless an ash management plan has been submitted for the ash from such unit. The application for each permit to be issued to a new or modified municipal waste incineration unit or renewal or issuance of a permit for an existing unit, shall include a reasonable demonstration of adequate capacity to treat, manage, or dispose of the ash produced by the unit for a period of not less than five years in compliance with the requirements of section 4011 of the Solid Waste Disposal Act. Demonstrations required by this paragraph shall be updated every five years as required by subsection (f).

(B) The Administrator may promulgate regulations or issue guidelines for the implementation of this paragraph which shall provide that, to the extent practicable, demonstrations are based on the characteristics of ash from the municipal waste incineration unit as determined by testing methods prescribed pursuant to section 4011 of the Solid Waste Disposal Act. The initial demonstration required for new or modified municipal waste incineration units under this paragraph shall be based on the characteristics of the ash from units of comparable design (including pollution control equipment and ash treatment systems) combusting similar waste streams.

(C) Notwithstanding any other provision of this Act or the Solid Waste Disposal Act, no person may operate a municipal waste incineration unit unless adequate capacity is available to treat, manage or dispose of the ash produced by the unit in compliance with section 4011 of the Solid Waste Disposal Act.

(c) Interim Standards.—If the Administrator fails to promulgate standards under subsection (a) of this section, beginning eighteen months after the date of enactment of this section and extending until such time as standards are promulgated no permit may be granted to the owner or operator of any municipal waste incineration unit which begins operation after July 1, 1989, and which is required to obtain a permit under a State program approved under part C or part D of this Act unless such permit requires compliance with emission standards that comply with subsection (a)(2)(B). Compliance with standards promulgated under subsection (a) shall be

required six months after the date such standards are promulgated for all municipal waste incineration units subject to the provisions of this subsection, unless a unit is required to install an acid gas scrubber to comply with a standard in which case the standard shall be effective for such unit no later than twenty-four months after promulgation.

(d) STANDARDS FOR EXISTING UNITS.—(1) Not later than eighteen months after the enactment of this section, the Administrator shall promulgate regulations and standards of performance to control emissions of air pollutants into the ambient air from each municipal waste incineration unit which is in operation or which is substantially completed prior to January 1, 1989. Such standards of performance shall be established on the basis of the degree of emission limitation achievable through application of available control technologies and practices as determined under subsection (a)(1), and shall specify emission limitations for the substances required under subsection (a)(2). In establishing standards under this subsection the Administrator may distinguish between types and classes of municipal waste incineration units based on combustion technology or pollution control systems.

(2) Except as provided in paragraph (3), any such standard shall not allow—

(A) an outlet gas carbon monoxide concentration greater than 100 parts per million corrected to 7 percent oxygen on an 8-hour average except that the Administrator is authorized to establish a standard for units allowing carbon monoxide concentrations not to exceed 200 parts per million corrected to 7 percent oxygen on an 8-hour average provided that such units control emissions with acid gas scrubbers and fabric filtration;

(B) an outlet gas particulate concentration greater than 0.020 grains per dry standard cubic foot corrected to 7 percent oxygen;

(C) an outlet gas concentration of sulfur dioxide greater than 60 parts per million corrected to 7 percent oxygen on an 8-hour average, unless uncontrolled emissions of sulfur dioxide are reduced by 70 percent;

(D) an outlet gas concentration of hydrogen chloride of 45 parts per million corrected to 7 percent oxygen, unless uncontrolled emissions of hydrogen chloride are reduced by 90 percent;

(E) a retention temperature and time of less than 1800 degrees Fahrenheit or less than 1 second at fully mixed height (or the equivalent); or

(F) a flue gas temperature of 450 degrees Fahrenheit or more averaged over 4 hours at the inlet of the particulate control device.

The Administrator shall promulgate a schedule for compliance with these standards. In no event shall such schedule provide for compliance with such standards later than the date six years after the enactment of this section.

(3) The Administrator shall by regulation establish periods of unit startup, unit shutdown and process upset to which the requirements of paragraph (2)(A) do not apply and as part of such standards shall include a numerical limitation for carbon monoxide

emissions and a requirement that auxiliary fuels be used during such periods to minimize emissions.

(e) Monitoring.—(1) The Administrator shall promulgate regulations requiring the owner or operator of each municipal waste incineration unit—

(A) to monitor emissions from the unit at the point at which such emissions are emitted into the ambient air (or within the stack, combustion chamber or pollution control equipment, as appropriate) and at such other points as necessary to protect human health and the environment;

(B) to monitor such other parameters relating to the operation of the unit and its pollution control technology as the Administrator determines are appropriate; and

(C) to report the results of such monitoring.

Such regulations shall contain provisions regarding the frequency of monitoring, test methods and procedures validated on municipal incineration units, and the form and frequency of reports containing the results of monitoring and shall require that any monitoring reports or test results indicating exceedance of standards under this section shall be reported separately and in a manner that facilitates review for purposes of enforcement actions. Such regulations shall require that copies of the results of such monitoring be maintained on file at the facility concerned and that copies shall be made available for inspection and copying by interested members of the public during business hours.

(2) The Administrator shall promulgate the regulations required under this subsection within eighteen months after the enactment of this section. Such regulations may be revised from time to time in accordance with paragraph (1). Except as provided in paragraph (3), the requirements of this subsection shall take effect—

(A) upon commencement of operation of any new or modified unit; and

(B) twenty-four months after the enactment of this part in the case of any existing municipal waste incineration unit.

(3)(A) The regulations promulgated under this subsection shall, at a minimum, require continuous monitoring for the following: opacity, hydrogen chloride (if such monitoring device or method is available), sulfur dioxide, oxides of nitrogen, carbon monoxide, carbon dioxide, oxygen, stack temperature, furnace temperature (or secondary combustion zone temperature, as appropriate) and stack gas temperature at the inlet to the particulate control device.

(B) For all emissions subject to standards under this section that are not subject to continuous monitoring under subparagraph (A), the regulations promulgated under this subsection shall require periodic monitoring of such emissions at each municipal waste incineration unit not less frequently than—

(i) every six months, or

(ii) six months after commencement of operations, and every eighteen months thereafter if the owner or operator of such unit demonstrates that such unit has complied with all applicable emissions standards as of the commencement of operations and during the previous periods of monitoring and maintains compliance with all applicable emissions standards during each interval between monitoring.

Regulations promulgated under this section shall provide for prompt monitoring of emissions and parameters which are not monitored continuously whenever there is a violation of a related emission standard or parameter which is continuously monitored.

(C) The initial monitoring under this subsection shall commence at the later of the following—

(i) the date six months after the promulgation of regulations under this subsection; or

(ii) the commencement of operation of the unit concerned.

(4) Notwithstanding the provisions of paragraph (3), regulations promulgated under this subsection and applicable to municipal waste incineration units which are not major emitting facilities as defined in part C may provide for monitoring with other than EPA-certifiable monitoring methods and shall at a minimum require continuous monitoring of: oxygen; opacity; furnace temperature (or secondary combustion zone temperature, as appropriate); carbon monoxide; pH; and such other parameters as the Administrator shall require.

(5)(A) The regulations required by this subsection may require the owner or operator of each municipal waste incineration unit to establish and operate, or to pay the costs of establishing and operating, a program to detect impacts of the unit, or any associated releases, on the environment or human health. Such program shall require periodic testing for and public reporting of the presence of waste constituents or contaminants (or indicators thereof) at statistically significant levels.

(B) In any case in which exposure to municipal waste incineration unit emissions or ash may pose a potential risk to human health, the Administrator or the State may request the Administrator of the Agency for Toxic Substances and Disease Registry to conduct a health assessment in connection with the unit and such other health studies or surveillance as may be warranted, as authorized under section 104(i) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980. Such studies may include programs to detect changes in the body burden of various pollutants including but not limited to lead, mercury, cadmium, halogenated hydrocarbons, and dioxins in any area affected by incineration unit emissions or ash.

(f) PERMITS.—Notwithstanding any other provision of this Act, each permit for a municipal waste incineration unit issued under this Act may be issued for a period of up to twenty years and shall be reviewed every five years after date of issuance or reissuance. Each permit shall continue in effect after the date of issuance until the date of termination, unless the Administrator or State determines—

(1) that the unit is not in compliance with all standards and conditions contained in the permit; or

(2) capacity to treat or dispose of the ash from such unit in compliance with section 4011 of the Solid Waste Disposal Act for a five-year period after such determination has not been demonstrated.

Such determination shall be made at regular intervals during the term of the permit, such intervals not to exceed five years, and only after public comment and public hearing. No permit for a munici-

pal waste incineration unit may be issued under this Act by an agency, instrumentality or person (other than a Governor) that is also responsible, in whole or part, for the design and construction or operation of the unit. Notwithstanding any other provision of this subsection, the Administrator or State may require the owner or operator of any unit to comply with emissions limitations or implement any other measures, if the Administrator or State determines that emissions in the absence of such limitations or measures may reasonably be anticipated to endanger public health or the environment.

(g) OTHER AUTHORITY.—(1) Nothing in this section shall diminish or otherwise affect any authority to establish and enforce standards under section 111 or 112 or under any other authority of law for emissions from municipal waste incineration units of any air pollutant not referred to in subsection (a). With respect to emissions from municipal waste incineration units of any air pollutant referred to in subsection (a)—

(A) nothing in this section shall diminish the authority of the Administrator to promulgate more stringent standards under section 112 or any other provision of this Act;

(B) nothing in this section shall diminish the authority of the Administrator or a State to establish any other requirements under any other authority of law, including the authority to establish for any such air pollutant a national ambient air quality standard;

(C) no requirement of an applicable implementation plan under section 165 (relating to construction of facilities in regions identified pursuant to section 107(d), relating to the designation of areas as nonattainment with respect to a national ambient air quality standard) or under section 172 (relating to permits for construction and operation in nonattainment areas) may be used to weaken the standards in effect under this section; and

(D) nothing in this section shall be interpreted, construed or applied to limit the authority of the Administrator to impose more stringent requirements for the incineration of hospital or other infectious wastes under this Act or other authority including subtitle C of the Solid Waste Disposal Act (42 U.S.C. 6921, et seq.).

(2) Nothing in this Act shall be construed, interpreted, or applied to preempt, supplant, or displace other State or Federal law, whether statutory or common.

(h) STATE PROGRAMS.—Any State may submit to the Administrator a proposed State program for implementation and concurrent enforcement of the requirements of this section. After ninety days after submission to the Administrator, the State shall be treated as authorized to enforce the requirements of this section in such State unless the Administrator determines that the State program does not provide enforcement equivalent to Federal enforcement under this Act. Whenever the Administrator determines that a State is not enforcing the requirements of this section in a manner equivalent to Federal enforcement, the Administrator shall withdraw the authorization for such State. Each State program approved under this subsection shall, at a minimum, include permitting requirements for

each new and existing municipal waste incineration unit located in the State. Any permit issued by a State may be reviewed and withdrawn by the Administrator on the Administrator's own motion or upon a showing by any person that the conditions contained in such permit are not in compliance with the requirements of this Act.

(i) State Authority.—Nothing in this section shall preclude or deny the right of any State or political subdivision thereof to adopt or enforce any regulation, requirement, or standard relating to municipal waste incineration units that is more stringent than a regulation, requirement, or standard in effect under this section or under any other provision of this Act.

(j) Enforcement.—For purposes of sections 111(e), 113, 114, 116, 120, 304, and 307 each standard and other requirement promulgated under this section shall be treated in the same manner as a standard of performance under section 111 which is an emission limitation and each requirement of a State plan authorized under this section shall be treated as a requirement of an applicable implementation plan. Any civil penalties imposed by a court against a unit of local government under this Act for violations of this section shall be paid into a trust fund or comparable mechanism established by a court or the State and shall be applied in support of public programs or activities, as authorized by the court (or a fund administrator appointed by the court), that serve to enhance the protection of human health and the environment of the residents of such unit of local government but shall not be used to come into compliance with requirements established under this section or section 4011 of the Solid Waste Disposal Act.

(k) Definitions.—As used in this section—

(1) The term "municipal waste incineration unit" means a distinct operating unit of any facility which combusts any solid waste material from commercial or industrial establishments or the general public (including single and multiple residences, hotels, and motels). Such term does not include incinerators or other units required to have a permit under section 3005 of the Solid Waste Disposal Act. The Administrator may promulgate standards for hospital incineration units (or other units operated principally to handle infectious wastes) under other provisions of this Act or section 3005 of the Solid Waste Disposal Act in lieu of standards under this section, provided that such standards are no less stringent than the standards under this section which are applicable to municipal waste incineration units of a comparable class or type. Until such regulations are promulgated, hospital incineration units (or other units operated principally to handle infectious wastes) shall be subject to the requirements of this section. The term "municipal waste incineration unit" does not include air curtain incinerators provided that such incinerators only burn wood wastes, yard wastes and clean lumber and that such incinerators comply with opacity limitations to be established by the Administrator by rule.

(2) The term "new municipal waste incineration unit" means a municipal waste incineration unit—

(A) the construction or modification of which is commenced after the Administrator proposes requirements

under this section establishing emissions standards or other requirements which would be applicable to such unit, or

(B) effective January 1, 1992, which had commenced operation thirty years or more previously, except that any unit in compliance with the requirements of subsection (d) shall not be considered a new unit until thirty years after the date for compliance specified in such subsection.

(3) The term "substantially completed unit" means a unit not in operation before July 1, 1989 for which the addition of required pollution control equipment will cost more than twice what such equipment would have cost had it been constructed as part of the permitted design or for which 90 percent of all construction has been completed before such date.

(4) The term "modified municipal waste incineration unit" means a municipal waste incineration unit at which modifications have occurred after the effective date of a standard under subsection (a) or (d) if (A) the cumulative cost of the modifications, over the life of the unit, exceed 50 per centum of the original cost of construction and installation of the unit (not including the cost of any land purchased in connection with such construction or installation), or (B) the modification is a physical change in or change in the method of operation of the unit which increases the amount of any air pollutant emitted by the unit for which standards have been established under this section.

(5) The term "existing municipal waste incineration unit" means a municipal waste incineration unit which is not a new or modified municipal waste incineration unit.

(l) SOURCE SEPARATION.—(1) Not later than eighteen months after the enactment of this section, the Administrator shall publish guidelines identifying items or materials that should be removed from municipal waste prior to incineration, either through separation by the generator of such waste or at a central facility from the general waste stream or through limitations on the composition (including inks and pigments) of products or on the disposal of such items or materials in municipal waste.

(2) Regulations under this section shall require the operator of any municipal waste incineration unit to establish contractual requirements or other appropriate notification and inspection procedures sufficient to assure that the unit does not receive any waste required to be placed in a facility permitted under section 3005 of the Solid Waste Disposal Act.

(m) PRODUCT COMPENSATION.—If the Administrator finds that there is a reasonable basis to conclude that any product or article distributed in commerce presents, or may (to a reasonable degree of certainty) present, a threat to human health or the environment as the result of incineration of such product or article at municipal waste incineration units which are in compliance with standards promulgated under this section or as the result of the handling or disposal of ash from such units, the Administrator shall by rule apply one or more of the following requirements to the composition of such product or article, its distribution in commerce or methods

of disposal as may be necessary to protect human health and the environment—

(1) requirements prohibiting or limiting the manufacture, processing or distribution in commerce of such product or article;

(2) requirements with respect to the concentration of any substances in the composition of the product or article, including a prohibition on the presence of such substances in the product, article or its residue;

(3) requirements for the marking or labeling of such product or article, including instructions for the proper disposal of such product or article or its residues;

(4) requirements for recovering or recycling such product or article, including the imposition of reimbursable fees on the sale of such product or article;

(5) requirements that solid waste management plans for areas served by municipal waste incineration units as required by subsection (b) of this section provide for the separation, recovery or recycling of such products or articles or residues to prevent, to the maximum extent practicable, any threat to human health or the environment which may result from the incineration of such products, articles or their residues or the handling or disposal of ash from units which have incinerated such products, articles or their residues; or

(6) requirements for the disposal of such product or article or its residues.

Not later than twenty-four months after the date of enactment of this section, the Administrator shall identify not less than five pollutants which present the greatest threat to public health or the environment as the result of municipal waste combustion or the disposal of ash from such combustion and for which health and environmental threats can be substantially diminished through rules issued pursuant to this subsection. The Administrator shall make a determination under this subsection with respect to the principal consumer or commercial products or residues of such products which contribute to the generation of the identified pollutants not later than thirty-six months after the date of enactment of this subsection.

(n) OPERATOR TRAINING.—Not later than eighteen months after the enactment of this section, the Administrator shall develop and promote a model State program for the training and certification of municipal waste incinerator operators. The program shall include a requirement that all operators achieve a passing grade on an examination on (and participate in continuing education to stay informed about) current technology for the control of pollution from municipal waste incineration units. The Administrator may authorize any State to implement a State program for the training and certification of municipal waste incinerator operators if the State has adopted a program which is at least as stringent as the model program developed by the Administrator. Beginning on the date thirty months after the date of enactment of this section it shall be unlawful to operate a municipal waste incineration unit unless each person with control over processes affecting emissions from such unit has satisfactorily completed a training and certification pro-

gram meeting the requirements established by the Administrator under this subsection.

[Part B—Ozone Protection

[PURPOSES

[Sec. 150. The purposes of this part are (1) to provide for a better understanding of the effects of human actions on the stratosphere, especially the ozone in the stratosphere, (2) to provide for a better understanding of the effects of changes in the stratosphere, expecially the ozone in the stratosphere on the public health and welfare, (3) to provide information on the progress of regulation of activities which may reasonably be anticipated to affect the ozone in the stratosphere in such a way as to cause or contribute to endangerment of the public health or welfare, and (4) to provide information on the need for additional legislation in this area, if any.

[FINDINGS AND DEFINITIONS

[Sec. 151. (a) The Congress finds, on the basis of presently available information, that—

[(1) halocarbon compounds introduced into the environment potentially threaten to reduce the concentration of ozone in the stratosphere;

[(2) ozone reduction will lead to increased incidence of solar ultraviolet radiation at the surface of the Earth;

[(3) increased incidence of solar ultraviolet radiation is likely to cause increased rates of disease in humans (including increased rates of skin cancer), threaten food crops, and otherwise damage the natural environment;

[(4) other substances, practices, processes, and activities may affect the ozone in the stratosphere, and should be investigated to give early warning of any potential problem and to develop the basis for possible future regulatory action; and

[(5) there is some authority under existing law, to regulate certain substances, practices, processes, and activities which may affect the ozone in the stratosphere.

[DEFINITIONS

[Sec. 152. For the purposes of this subtitle—

[(1) the term "halocarbon" means the chemical compounds $CFCl_3$ and CF_2Cl_2 and such other halogeated compounds as the Administrator determines may reasonably be anticipated to contribute to reductions in the concentration of ozone in the stratosphere;

[(2) the term "stratosphere" means that part of the atmosphere above the tropopause.

[STUDIES BY ENVIRONMENTAL PROTECTION AGENCY

[Sec. 153. (a) The Administrator shall conduct a study of the cumulative effect of all substances, practices, processes, and activities which may affect the stratosphere, especially ozone in the stratosphere. The study shall include an analysis of the independent effects on the stratosphere especially such ozone in the stratosphere of—

[(1) the release into the ambient air of halocarbons,

[(2) the release into the ambient air of other sources of chlorine,

[(3) the uses of bromine compounds, and

[(4) emissions of aircraft and aircraft propulsion systems employed by operational and experimental aircraft.

The study shall also include such physical, chemical, atmospheric, biomedical, or other research and monitoring as may be necessary to ascertain (A) any direct or indirect effects upon the public health and welfare of changes in the stratosphere, especially ozone in the stratosphere, and (B) the probable causes of changes in the stratosphere, especially the ozone in the stratosphere.

[(b) The Administrator shall undertake research on—

[(1) methods to recover and recyle substances which directly or indirectly affect the stratosphere, expecially ozone in the stratosphere,

[(2) methods of preventing the escape of such substances,

[(3) safe substitutes for such substances, and

[(4) other methods to regulate substances, practices, processes, and activites which may reasonably be anticipated to affect the stratosphere, especially ozone in the stratosphere.

[(c)(1) The studies and research conducted under this section may be undertaken with such cooperation and assistance from universities and private industry as may be available. Each department, agency, and instrumentality of the United Sttes having the capability to do so is authorized and encouraged to provide assistance to the Administrator in carrying out the requirements of this section, including (notwithstanding any other provision of law) any services which such department, agency, or instrumentality may have the capability to render or obtain by contract with third parties.

[(2) The Administrator shall encourage the cooperation and assistance of other nations in carrying out the studies and research under this section. The Administrator is authorized to cooperate with and support similar research efforts of other nations.

[(d)(1) The Administrator shall undertake to contract with the National Academy of Sciences to study the state of knowledge and the adequacy of research efforts to understand (A) the effects of all substances, practices, processes, and activities which may affect the stratosphere, especially ozone in the stratosphere; (B) the health and welfare effects of modifications of the stratosphere, especially ozone in the stratosphere; and (C) methods of control of such substances, practices, processes, and activities including alternatives, costs, feasibility, and timing. The Academy shall make a report of its findings by January 1, 1978.

[(2) The Administrator shall make available to the Academy such information in the Administrator's possession as needed for the purposes of the study provided for in this subsection.

[(e) The Secretary of Labor shall study and transmit a report to the administrator and the Congress not later than six months after date of enactment, with respect to the losses and gains to industry and employment which could result from the elimination of the use of halocarbons in aerosol containers and for other purposes. Such report shall include recommended means of alleviating unemployment or other undesirable economic impact, if any, resulting therefrom.

[(f)(1) The Administrator shall establish and act as Chairman of a Coordinating Committee for the purpose of insuring coordination of the efforts of other Federal agencies carrying out research and studies related to or supportive of the research provided for in subsections (a) and (b) and section 154.

[(2) Members of the Coordinating Committee shall include the appropriate official responsible for the relevant research efforts of each of the following agencies;

[(A) the National Oceanic and Atmospheric Administration.
[(B) the National Aeronautics and Space Administration,
[(C) the Federal Aviation Administration,
[(D) the Department of Agriculture.
[(E) the National Cancer Institute,
[(F) the National Institute of Environmental Health Sciences,
[(G) the National Science Foundation, and the approriate officials responsible for the relevant research efforts of such other agencies carrying out related efforts as the Chairman shall designate. A representative of the Department of State shall sit on the Coordinating Committee to encourage and facilitate international coordination.

[(3) the Coordinating Committee shall review and comment on plans for, and the execution and results of, pertinent research and studies. For this purpose, the agencies named in or designed under paragraph (2) of this subsection shall make appropriate and timely reports to the Coordinating Committee on plans for and the execution and results of such research and studies.

[(4) The Chairman may request a report from any Federal Agency for the purpose of determining if that agency should sit on the Coordinating Committee.

[(g) Not later than January 1, 1978, and biennially thereafter, the Administrator shall report to the appropriate committees of the House and the Senate, the results of the studies and research conducted under this section and the results of related research and studies conducted by other Federal agencies.

[RESEARCH AND MONITORING BY OTHER AGENCIES

[SEC. 154. (a) The Administrator of the National Oceanic and Atmospheric Administration shall establish a continuing program of research and monitoring of the stratosphere for the purpose of early detection of changes in the stratosphere and climatic effects of such changes. Such Administrator shall on or before January 1, 1978, and biennially thereafter, transmit such report to the Administrator and the Congress on the findings of such research and monitoring. Such report shall contain any appropriate recommendations for legislation or regulation (or both).

[(b) The National Aeronautics and Space Administration shall, pursuant to its authority under title IV of the National Aeronautics and Space Act of 1958, continue programs of research, technology, and monitoring of the stratosphere for the purpose of understanding the physics and chemistry of the stratosphere and for the early detection of potentially harmful changes in the ozone in the stratosphere. Such Administration shall transmit reports by January 1, 1978, and biennially thereafter to the Administrator and the Congress on the results of the programs authorized in this subsection, together with any appropriate recommendations for legislation or regulation (or both).

[(c) The Director of the National Science Foundation shall encourage and support ongoing stratospheric research programs and continuing research programs that will increase scientific knowledge of the effects of changes in the ozone layer in the stratosphere upon living organisms and ecosystems. Such Director shall transmit reports by January 1, 1978, and biennially thereafter to the Administrator and the Congress on the results of such programs, together with any appropriate recommendations for legislation or regulation (or both).

[(d) The Secretary of Agriculture shall encourage and support continuing research programs that will increase scientific knowledge of the effects of changes in the ozone in the stratosphere upon animals, crops, and other plant life. Such Secretary shall transmit reports by January 1, 1978, and biennially thereafter to the Administrator and the Congress on the results of such programs together with any appropriate recommendations for legislation or regulation (or both).

[(e) The Secretary of Health, Education, and Welfare shall encourage and support continuing research programs, that will increase scientific knowledge of the effects of changes in the ozone in the stratosphere upon human health. Such Secretary shall transmit reports by January 1, 1978, and biennially thereafter, to the Administrator and the Congress on the results of such programs, together with any appropriate recommendations for legislation or regulation (or both).

[(f) In carrying out subsections (a) through (c) of this section, the agencies involved (1) shall enlist and encourage cooperation and assistance from other Federal agencies, universities, and private industry, and (2) shall solicit the views of the Administrator with regard to plans for the research involved so that any such research will, if regulatory action by the Administrator is indicated, provide the preliminary information base for such action.

[PROGRESS OF REGULATION

[Sec. 155. The Administrator shall provide an interim report to the Congress by January 1, 1978, shall provide a final report within two years after date of enactment, and shall provide follow-up reports annually thereafter on the actions taken by the Environmental Protection Agency and all other Federal agencies to regulate sources of halocarbon emissions, the results of such regulations in protecting the ozone layers, and the need for additional regulatory action, if any. The reports under this section shall also include recommendations for the control of substances, practices, processes, and activities other than those involving halocarbons, which we found to affect the ozone in the stratosphere and which may cause or contribute to harmful effects on public health or welfare.

[INTERNATIONAL COOPERATION

[SEC. 156. The President shall undertake to enter into international agreements to foster cooperative research which complements studies and research authorized by this part, and to develop standards and regulations which protect the stratosphere consistent with regulations applicable within the United States. For these purposes the President through the Secretary of State and the Assistant Secretary of State for Oceans and International Environmental and Scientific Affairs, shall negotiate multilateral treaties, conventions, resolutions, or other agreements, and formulate, present, or support proposals at the United Nations and other appropriate international forums and shall report to the Congress periodically on efforts to arrive at such agreements.

[REGULATIONS

[SEC. 157. (a) If at any time prior to the submission of the final report referred to in section 155 in the Administrator's judgment, any substance, practice, process, or activity may reasonably be anticipated to affect the stratosphere, especially ozone in the stratosphere, and such effect may reasonably be anticipated to endanger public health or welfare, the Administrator shall promptly promulgate regulations respecting the control of such substance, practice, process, or activity, and shall simultaneously submit notice of the promulgation of such regulation to the Congress.

[(b) Upon submission of the final report referred to in section 155, and after consideration of the research and study under sections 153 and 154 and, consultation with the Administrator shall propose regulations for the control of any substance, practice, process, or activity (or any combination thereof) which in his judgment may reasonably be anticipated to affect the stratosphere, especially ozone in the stratosphere, if such effect in the stratosphere may reasonably be anticipated to endanger public health or welfare. Such regulations shall take into account the feasibility and the costs of achieving such control. Such regulations may exempt medical use products for which he Administrator determines there is no suitable substitute. Not later than three months after proposal of such regulations the Administrator shall promulagate such regulations in final form. From time to time, and under the same procedures, the Administrator may revise any of the regulations submitted under this subsection.

[OTHER PROVISIONS UNAFFECTED

[SEC. 158. Nothing in this part shall be construed to alter or affect the authority of the Administrator under section 303 (relating to emergency powers), under section 231 (relating to aircraft emission standards), or under any other provision of this Act or to affect the authority of any other department, agency, or instrumentality of the United States under any other provision of law to promulgate or enforce any requirement respecting the control of any substance, practice, process, or activity for purposes of protecting the stratosphere or ozone in the stratosphere. In the case of any proposed rule respecting ozone in the stratosphere which has been published under the Toxic Substances Control Act prior to the date of enactment of this Act notwithstanding section 9(b) of such Act, nothing in this part shall be construed to prohibit or restrict the Administrator from taking any action under the Toxic Substances Control Act respecting the promulgation or enforcement of such rule.

[STATE AUTHORITY

[SEC. 159. (a) Nothing in this part shall preclude or deny any State or political subdivision thereof from adopting or enforcing any requirement respecting the control of any substance, practice, process, or activity for purposes of protecting the stratosphere or ozone in the stratosphere except as otherwise provided in subsection (b).

[(b) If a regulation of any substance, practice, process, or activity is in effect under this part in order to prevent or abate any risk to the stratosphere, or ozone in the stratosphere, no State or political subdivision thereof may adopt or attempt to enforce any requirement respecting the control of any such substance, practice, process, or activity to prevent or abate such risk, unless the requirement of the State or political subdivision is identical to the requirement of such regulation. The preceding sentence shall not apply with respect to any law or regulation of any State or political subdivision controlling the use of halocarbons as propellants in aerosol spray containers.]

* * * * * * *

OTHER POLLUTANTS

SEC. 166. (a) * * *

* * * * * * *

(f) PM-10 INCREMENTS.—The Administrator is authorized to substitute, for the maximum allowable increases in particulate matter specified in section 163(b) and section 165(d)(2)(C)(iv), maximum allowable increases in particulate matter with an aerodynamic diameter smaller than or equal to ten micrometers. Such substituted maximum allowable increases shall be at least as stringent in effect as those specified in the provisions for which they are substituted. Until the Administrator promulgates regulations under the authority of this section, the current maximum allowable increases in concentrations of particulate matter shall remain in effect.

ENFORCEMENT

SEC. 167. The Administrator shall, and a State may, take such measures, including issuance of an order, or seeking injunctive relief, as necessary to prevent [the construction of a major emitting facility] *the operation, construction, or modification of a major emitting facility* which does not conform to the requirements of this part, or which is proposed to be constructed in any area included in the list promulgated pursuant to paragraph (1) (D) or (E) of subsection (d) of section 107 of this Act and which is not subject to an implementation plan which meets the requirements of this part.

* * * * * * *

DEFINITIONS

SEC. 169. For purposes of this part—

(1) The term "major emitting facility" means any of the following stationary sources of air pollutants which emit, or have the potential to emit, one hundred tons per year or more of any air pollutant from the following types of stationary sources: fossil-fuel fired steam electric plants of more than two hundred and fifty million British thermal units per hour heat input, coal cleaning plants (thermal dryers), kraft pulp mills, Portland Cement plants, primary zinc smelters, iron and steel mill plants, primary aluminum ore reduction plants, primary copper smelters, municipal incinerators capable of charging more than [two hundred and] fifty tons of refuse per day, hydrofluoric sulfuric, and nitric acid plants, petroleum refineries, lime plants, phosphate rock processing plants, coke oven batteries, sulfur recovery plants, carbon black plants (furnace process) primary lead smelters, fuel conversion plants, sintering plants, secondary metal production facilities, chemical process plants, fossil-fuel boilers of more than two hundred and fifty million British thermal units per hour heat input, petroleum storage and transfer facilities with a capacity exceeding three hundred thousand barrels, taconite ore processing facilities, glass fiber processing plants, charcoal production facilities. Such term also includes any other source with the potential to emit two hundred and fifty tons per year or more of any air pollutant. This term shall not include new or modified facilities which are nonprofit health or education institutions which have been exempted by the State.

* * * * * * *

(3) The term "best available control technology" means an emission limitation based on the maximum degree of reduction of each pollutant subject to regulation under this Act emitted from or which results from any major emitting facility, which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such facility through application of production processes and available methods, systems, and techniques, including fuel cleaning or treatment, *clean fuels,* or innovative fuel combustion techniques for control of each such pollutant. In no event shall application of "best available control technology" result in emission of any pollutants which will exceed the emissions allowed by any applicable standard established pursuant to section 111 or 112 of this Act.

PART D—PLAN REQUIREMENTS FOR NONATTAINMENT AREAS

SUBPART 1—NONATTAINMENT AREAS IN GENERAL

APPLICABILITY

SEC. 170. Each provision of this subpart applies as set forth herein, except to the extent it is inconsistent with a provision in another subpart, in which case the provision in such other subpart shall apply.

DEFINITIONS

SEC. 171. For the purpose of this part and section 110(a)(2)(I)—

* * * * * * *

[(2) The term "nonattainment area" means, for any air pollutant an area which is shown by monitored data or which is calculated by air quality modeling (or other methods determined by the Administrator to be reliable) to exceed any national ambient air quality standard for such pollutant. Such term includes any area identified under subparagraphs (A) through (C) of section 107(d)(1).]

(2) The term "nonattainment area" means, for any air pollutant, an area which is designated "nonattainment" with respect to that pollutant pursuant to section 107.

* * * * * * *

(5) The term "major stationary source" or "major emitting facility" includes each discrete operation, unit or other activity and each combination thereof that, except as otherwise provided in this part, produces or has the potential to produce emissions of 100 tons or more per year of a pollutant or precursors of a pollutant which contribute to ambient air quality in an area that does not meet the national ambient air quality standard for the pollutant.

NONATTAINMENT PLAN PROVISIONS

SEC. 172. [(a)(1) The provisions of an applicable implementation plan for a State relating to attainment and maintenance of national ambient air quality standards in any nonattainment area which are required by section 110(a)(2)(I) as precondition for the construction or modification of any major stationary source in any such area on or after July 1, 1979, shall provide for attainment of each such national ambient air quality standard in each such area as expeditiously as practicable, but, in the case of national primary ambient air quality standards, not later than December 31, 1982.

[(2) In the case of the national primary ambient air quality standard for photochemical oxidants or carbon monoxide (or both) if the State demonstrates to the satisfaction of the Administrator (on or before the time required for submission of such plan) that such attainment is not possible in an area with respect to either or both of such pollutants within the period prior to December 31, 1982, despite the implementation of all reasonably available measures, such provisions shall provide for the attainment of the national primary standard for the pollutant (or pollutants) with respect to which such demonstration is made, as expeditiously as practicable but not later than December 31, 1987.]

(a) Attainment Dates for Nonattainment Areas—(1) The attainment date for an area designated nonattainment with respect to a primary national ambient air quality standard shall be the date by which attainment can be achieved as expeditiously as practicable, but no later than five years from the date such area was designated nonattainment under section 107, except that the Administrator may extend the attainment date to the extent the Administrator determines appropriate, for a period no greater than ten years from the date of designation as nonattainment, considering the severity of nonattainment and the availability and feasibility of pollution control measures.

(2) The attainment date for an area designated nonattainment with respect to a secondary national ambient air quality standard shall be within a reasonable time after the date such area was designated nonattainment under section 107.

(b) Schedule for Plan Submissions.—At the time the Administrator designates an area as nonattainment with respect to a national ambient air quality standard under section 107, the Administrator shall establish a schedule according to which the State containing such area shall submit a plan or plan revision (including the plan items) meeting the applicable requirements of subsection (c) and section 110(c). Such schedule must, at a minimum, include a date or dates, extending no later than two years from the date of the nonattainment designation, for the submission of a plan or plan revision (including the plan items) meeting the applicable requirements of subsection (c) and section 110(c).

[(b)] *(c) Nonattainment Plan Provisions.*—The [plan provisions required by subsection (a)] *provisions of an applicable implementation plan for a State relating to attainment and maintenance of national ambient air quality standards in any nonattainment area* shall—

(1) be adopted by the States (or promulgated by the Administrator under section 110(c)) after reasonable notice and public hearing;

(2) provide for the implementation of all reasonably available control measures as expeditiously as practicable;

(3) require, in the interim, reasonable further progress (as defined in section 171(1)) including such reduction in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of reasonably available control technology;

(4) include a comprehensive, accurate, current inventory of actual emissions from all sources (as provided by rule of the Administrator) of each such pollutant for each such area which is revised and resubmitted as frequently as may be necessary to assure that the requirements of paragraph (3) are met and to assess the need for additional reductions to assure attainment of each standard by the date required under subsection (a);

(5) expressly identify and quantify the emissions, if any, of any such pollutant which will be allowed to result from the

construction and operation of major new or modified stationary sources for each such area;

[(6) require permits for the construction and operation of new or modified major stationary sources in accordance with section 173 (relating to permit requirements);]

(6) require permits for the construction and operation of new or modified major stationary sources, and, beginning not later than three years after the date of enactment of the Clean Air Act Amendments of 1989, for the operation of all major stationary sources, in accordance with section 173 (relating to permit requirements);

(7) identify and commit the financial and manpower resources necessary to carry out the plan provisions required by this subsection;

(8) contain emission limitations, schedules of compliance and such other measures as may be necessary to meet the requirements of this section;

(9) evidence public, local government, and State legislative involvement and consultation in accordance with section 174 (relating to planning procedures) and include (A) an identification and analysis of the air quality, health, welfare, econmic, energy, and social effects of the plan provisions required by this subsection and of the alternatives considered by the State, and (B) a summary of the public comment on such analysis;

(10) include written evidence that the State, the general purpose local government or governments, or a regional agency designated by general purpose local governments for such purpose, have adopted by statute, regulation, ordinance, or other legally enforceable document, the necessary requirements and schedules and timetables for compliance, and are committed to implement and enforce the appropriate elements of the plan;

(11) in the case of plans which make a demonstration pursuant to paragraph (2) of subsection (a)—

(A) establish a program which requires, prior to issuance of any permit for construction or modfication of a major emitting facility, an analysis of alternative sites, sizes, production process, and environmental control techniques for such proposed source which demonstrates that benefits of the proposed source significantly outweigh the environmental and social costs imposed as a result of its location, construction, or modification;

(B) establish a specific schedule for implementation of a vehicle emission control inspection and maintenance program; and

(C) identify other measures necessary to provide for attainment of the applicable national ambient air quality standard not later than December 31, 1987.

[(c) In the case of a State plan revision required under the Clean Air Act Amendments of 1977 to be submitted before July 1, 1982, by reason of a demonstration under subsection (a)(2), effective on such date such plan shall contain enforceable measures to assure attainment of the applicable standard not later than December 31, 1987.]

PERMIT REQUIREMENTS

SEC. 173. *(a) CONSTRUCTION PERMITS.*—The permit program required by section 172(b)(6) shall provide that permits to construct [and operate] may be issued if—

(1) the permitting agency determines that—

(A) by the time the source is to commence operation, total allowable emissions from existing sources in the region, from new or modified sources which are not major emitting facilities, and from the proposed source will be sufficiently less than total emissions from existing sources allowed under the applicable implementation plan prior to the application for such permit to construct or modify so as to represent (when considered together with the plan provisions required under section 172) reasonable further progress (as defined in section 171); or

(B) that emissions of such pollutant resulting from the proposed new or modified major stationary source will not cause or contribute to emissions levels which exceed the allowance permitted for such pollutant for such area from new or modified major stationary sources under section 172(b);

(2) the proposed source is required to comply with the lowest achievable emission rate;

(3) the owner or operator of the proposed new or modified source has demonstrated that all major stationary sources owned or operated by such person (or by any entity controlling, controlled by, or under common control with such person) in such State are subject to emission limitations and are in compliance, or on a schedule for compliance, with all applicable emission limitations and standards under this Act; and

(4) the applicable implementation plan is being carried out for the nonattainment area in which the proposed source is to be constructed or modified in accordance with the requirements of this part.

Any emission reductions requird as a precondition of the issuance of a permit under paragraph (1)(A) shall be legally binding before such permit may be issued.

(b) OPERATING PERMITS.—

(1) Each operating permit issued as required pursuant to this part for a new or existing stationary source shall—

(A) be for a fixed term not to exceed five years and shall require compliance with applicable emission limitations and with such monitoring measures as are appropriate for adequately determining compliance with such limitations;

(B) require the permittee to submit quarterly reports to the permitting authority containing the results of the monitoring required under subparagraph (A) and, no less often than every six months, certification to the permitting authority that demonstrates compliance with the permit. Any report or certification required to be submitted by a permittee under this title shall be signed by a responsible corporate official who shall certify its accuracy;

(C) require that the permittee promptly report any violations of the permit or other requirements under this Act to the permitting authority and a program for correcting these violations including a schedule for implementation of the corrections; and

(D) set forth inspection and entry requirements to assure compliance with the permit terms and conditions.

(2) Applications for any permit to be issued pursuant to this part shall be accompanied by a fee sufficient to cover all direct and indirect costs of developing and administering the permit program.

(3) Before issuing any permit pursuant to the provisions of this part the State shall provide notice of the application and an opportunity for a public hearing on the conditions to be included in the permit.

(4) No permit may be issued pursuant to this part if the Administrator within sixty days objects to its issuance as not meeting the goals and objectives of this Act.

(5) A copy of each permit and certification shall be submitted by the permittee, or by the permitting authority (as determined by the permitting authority), to the Administrator and shall be available to the public in the same manner as is provided for records and reports under section 114(c). No such permit may be issued unless the permitting authority or its agent has conducted an on-site inspection of the source to which such permit is issued. Not later than six months after the enactment of this subsection the Administrator shall publish guidelines for permit programs under this part. Such guidelines may be revised from time to time as the Administrator deems appropriate.

(c) OFFSETS.—A new or modified major stationary source may comply with any offset requirement in effect under this part for increased emissions of any air pollutant by obtaining enforceable emissions reductions of such air pollutant from other sources in the same nonattainment area. Such enforceable emissions reductions shall be in effect by the time a new or modified source commences operation and shall assure that the total tonnage of increased emissions of the air pollutant from the new or modified source shall be offset by a greater reduction in the actual emissions of such air pollutant from other sources in the area. Where specific ratios for such offsets are specified in other provisions of this Act, such ratios shall govern. Emissions reductions otherwise required by law shall not be credited as an emissions reductions for purposes of any such offset requirement.

[PLANNING PROCEDURES

[SEC. 174. (a) Within six months after the enactment of the Clean Air Act Admendments of 1977, for each region in which the national primary ambient air quality standard for carbon monoxide or photochemical oxidants will not be attained by July 1, 1979, the State and elected officials of affected local governments shall jointly determine which elements of a revised implementation plan will be planned for and implemented or enforced by the State and

which such elements will be planned for an implemented or enforced by local governments or regional agencies, or any combination of local governments, regional agencies, or the State. Where possible within the time required under this subsection, the implementation plan required by this part shall be prepared by an organization of elected officials of local governments designated by agreement of the local governments in an affected area, and certified by the State for this purpose. Where such an organization has not been designated by agreement within six months after the enactment of the Clean Air Act Amendments of 1977, the Governor (or, in the case of an interstate area, Governors), after consultation with elected officials of local governments, and in accordance with the determination under the first sentence of this subparagraph, shall designate an organization of elected officials of local governments in the affected area or a State agency to prepare such plan. Where feasible, such organization shall be the metropolitan planning organization designated to conduct the continuing, cooperative and comprehensive transportation planning process for the area under section 134 of title 23, United State Code, or the organization responsible for the air quality maintenance planning process under regulations implementing this section, or the organization with both responsibilities.

[(b) The preparation of implementation plan provisions under this part shall be coordinated with the continuing, cooperative, and comprehensive transportation planning process required under section 134 of title 23, United States Code, and the air quality maintenance planning process required under section 110, and such planning processes shall take into account the requirements of this part.**]**

PLANNING PROCEDURES

SEC. 174. (a) For any ozone, carbon monoxide or PM–10 nonattainment area, the Governor of the State containing such areas and elected officials of affected local governments shall, prior to the date required for submittal of the inventories described under sections 182(a), 188(a), and 192(a), jointly review and update as necessary the planning procedures adopted pursuant to this subsection as in effect immediately before the date of enactment of the Clean Air Act Amendments of 1989 or develop new planning procedures pursuant to this subsection, as appropriate. In preparing such procedures the State and local elected officials shall determine which elements of a revised implementation plan will be developed, adopted, and implemented (through means including enforcement) by the State and which by local governments or regional agencies, or any combination of local governments, regional agencies, or the State. The implementation plan required by this part shall be prepared by an organization certified by the State, in consultation with elected officials of local government in the affected area, and representatives of the State air quality planning agency, the State transportation planning agency, the metropolitan planning organization designated to conduct the continuing, cooperative and comprehensive transportation planning process for the area under section 134 of title 23, United States Code, the organization responsible for the air quality attain-

ment and maintenance planning process under regulations implementing this Act, and any other organization with responsibilities for developing, submitting, or implementing the plan required by this part.

(b) The preparation of implementation plan provisions and subsequent plan revisions under the continuing transportation-air quality planning process described in section 108(e) shall be coordinated with the continuing, cooperative and comprehensive transportation planning process required under section 134 of title 23, United States Code, and such planning processes shall take into account the requirements of this part. The Administrator shall consult with, and make recommendations to, the Secretary of Transportation within nine months from the date of enactment of the Clean Air Act Amendments of 1989 on changes to the Department of Transportation policies and planning and programming process that will assist the planning and implementation process of this part.

(c) In the case of a nonattainment area that is included within more than one State, the affected States may jointly, through interstate compact or otherwise, undertake and implement all or part of the planning procedures described in this section.

* * * * * * *

SANCTIONS AND LIMITATIONS ON CERTAIN FEDERAL ASSISTANCE

SEC. 176. [(a) The Administrator shall not approve any projects or award any grants authorized by this Act and the Secretary of Transportation shall not approve any projects or award any grants under title 23, United States Code, other than for safety, mass transit, or transportation improvement projects related to air quality improvement or maintenance, in any air quality control region—

[(1) in which any national primary ambient air quality standard has not been attained,

[(3) where the Administrator finds after July 1, 1979, that the Governor has not submitted an implementation plan which considers each of the elements required by section 172 or that reasonable efforts toward submitting such an implementation plan are not being made (or, after July 1, 1982, in the case of an implementation plan revision required under section 172 to be submitted before July 1, 1982).]

(a) SANCTIONS.—The following actions, as required or authorized by provisions of subpart 2 (relating to ozone and ozone precursors), subpart 3 (relating to carbon monoxide), or subpart 4 (relating to PM–10) are available as specified in such subparts, to the Administrator or the Secretary of Transportation:

(1) a prohibition by the Administrator on the construction or modification of any major stationary source of the relevant pollutant or pollutants in a nonattainment area;

(2)(A) a prohibition, applicable to a nonattainment area, by the Secretary of Transportation on the approval of any projects or awarding of any grants, under title 23, United States Code, other than projects or grants specified under subparagraph (B).

(B) Projects or grants that may be approved, notwithstanding the prohibition in subparagraph (A), are the following—

(i) capital programs for improved public transit;

(ii) construction or restriction of certain roads or lanes solely for the use of passenger buses or high occupancy vehicles;

(iii) planning for and implementation of requirements for employers to reduce employee work-trip-related vehicle emissions;

(iv) highway ramp metering, traffic signalization, and related programs that improve traffic flow and achieve a net emission reduction;

(v) fringe and transportation corridor parking facilities serving multiple occupancy vehicle programs or transit operations;

(vi) programs for inspection and maintenance of vehicles emission control systems;

(vii) programs for the conversion of publicly-owned fleet vehicles to vehicles that use low-polluting fuels, or to otherwise control fleet vehicle operations and miles traveled;

(viii) programs to limit or restrict vehicle use in downtown areas or other areas of emission concentration particularly during periods of peak use, through road use charges, tolls, parking surcharges, or other pricing mechanisms, vehicle restricted zones or periods, or vehicle registration programs;

(ix) programs for breakdown and accident scene management, non-recurring congestion, and vehicle information systems, to reduce congestion and emissions; and,

(x) such other transportation-related programs as the Adminstrator, in consultation with the Secretary of Transportation, finds would improve air quality and would not encourage single occupancy vehicle capacity.

In considering such measures, the State should seek to ensure adequate access to downtown areas and avoid relocating emissions and congestion rather than reducing them. Notwithstanding the requirements of title 23, United States Code, or any other provision of law, any Federal funds made available to a State to carry out the provisions of such title shall be available without limitation to implement the programs and provisions of this subparagraph in nonattainment areas, and the State share shall not be required to exceed 10 percent of the cost of such programs.

(C) Nothing in this paragraph shall preclude the Secretary of Transportation from approving projects or awarding grants under title 23, United States Code, for (i) elimination of highway safety hazards pursuant to sections 130, 152, and 402 of such title, or (ii) rehabilitation or replacement of deteriorated highway bridges, provided that such projects or grants will add no significant additional right-of-way and are determined by the Administrator to be consistent with maintaining air quality;

(3) the withholding by the Administrator of all or part of the grants for support of air pollution planning and control programs that the Administrator is authorized to award under section 105.

[(b) In any area in which the State or, as the case may be, the general purpose local government or governments or any regional agency designated by such general purpose local governments for such purpose, is not implementing any requirement of an approved or promulgated plan under section 110, including any requirement for a revised implementation plan under this part, the Administrator shall not make any grants under this Act.]

[(c)] *(b)(1)* No department, agency, or instrumentality of the Federal Government shall [(1)] engage in, [(2)] support in any way or provide financial assistance for, [(3)] license or permit, or [(4)] approve, any activity which does not conform to a plan after it has been approved or promulgated under section 110. [No metropolitan planning organization designated under section 134 of title 23, United States Code, shall give its approval to any project, program, or plan which does not conform to a plan approved or promulgated under section 110.] The assurance of conformity to such a plan shall be an affirmative responsibility of the head of such department, agency, or instrumentality. *Conformity to a plan means—*

(A) conformity to a plan's purpose of eliminating or reducing the severity and number of violations of the national ambient air quality standards and achieving expeditious attainment of such standards; and

(B) that such activities will not, considering any growth likely to result from such activities—

(i) cause or contribute to any new violation of any standard in any area;

(ii) increase the frequency or severity of any existing violation of any standard in any area; or

(iii) delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.

(2) Any transportation plan or program developed pursuant to title 23, United States Code, or the Urban Mass Transportation Act shall implement all relevant transportation provisions of any implementation plan approved under this Act applicable to all or part of the area covered by such transportation plan or program. No Federal agency may approve, accept or fund any transportation plan, program or project unless such plan, program or project has been found to conform to this Act and any implementation plan in effect under this Act. In particular—

(A) no transportation plan or transportation improvement program may be adopted by a metropolitan planning organization designated under title 23, United States Code, or the Urban Mass Transportation Act, or be found to be in conformity by an air quality planning agency, department or officer until a final determination has been made that emissions expected from implementation of such plans and programs are consistent with estimates of emissions from motor vehicles and necessary emissions reductions contained in the State's implementation plan, and that the plan or program will, considering any growth likely to result from such plan or program, conform to the requirements of paragraph (1)(B);

(B) no metropolitan planning organization or other recipient of funds under title 23, United States Code, or the Urban Mass Transportation Act shall adopt or approve a transportation improvement program of projects until it determines that such program provides for timely implementation of transportation control measures consistent with schedules included in the applicable implementation plan;

(C) no transportation project may be adopted or approved by a metropolitan planning organization or any recipient of funds designated under title 23, United States Code, or the Urban Mass Transportation Act, or found in conformity by an air quality planning agency, or approved, accepted, or funded by the Department of Transportation unless—

(i) such a project comes from a conforming plan and program;

(ii) the design, scope, and emissions from such project have not changed significantly since the conformity finding regarding the plan and program from which the project derived;

(iii) emissions from such a project remain consistent with emissions reduction schedules in the applicable implementation plan; and

(iv) it is demonstrated, in any case where such a demonstration was not made during the process to determine the conformity of the plan and program from which project derived, that the project is consistent with the provisions of paragraph (1)(B).

The determinations required by this subsection shall be made by Federal, State and local agencies as prescribed pursuant to criteria and procedures which shall be promulgated by the Administrator no later than one year after the date of enactment of the Clean Air Act Amendments of 1989. Such procedures shall include a requirement that each State containing an ozone or carbon monoxide nonattainment area shall submit to the Administrator within eighteen months of such date of enactment, a revision to its implementation plan that includes, for each such nonattainment area, criteria and procedures for assessing the conformity of any plan, program or project subject to the conformity requirements of this subsection.

[(d)**]** *(c)* Each department, agency, or instrumentality of the Federal Government having authority to conduct or support any program with air-quality related transportation consequences shall give priority in the exercise of such authority, consistent with statutory requirements for allocation among States or other jurisdictions, to the implementation of those portions of plans prepared under this section to achieve and maintain the national primary ambient air quality standard. This paragraph extends to, but is not limited to, authority exercised under the Urban Mass Transportation Act, title 23 of the United States Code, and the Housing and Urban Development Act.

* * * * * * *

MAINTENANCE PLANS

SEC. 179. (a) PLAN REQUIREMENTS.—The maintenance plan required under section 107(d)(5)(C) as a precondition for redesignation of an area shall—

(1) comply with the provisions of section 110(a)(2);

(2) provide for the maintenance of the national ambient air quality standard of the relevant air pollutant in such area for a period of twenty years after attainment; and

(3) include the following provisions—

(A) an identification of sources, including area and mobile sources, that are expected to contribute to increases in emissions of such pollutant after attainment of a national ambient air quality standard;

(B) a quantitative estimate of emissions increases from such sources for each three-year period following attainment;

(C) an identification of transportation control measures, emission control limitations or standards, or permit requirements as may be necessary to limit emissions or permissible emission increases; and

(D) an identification of contingency measures to be implemented in the event of an exceedance of the air quality standard sufficient to correct any air pollution problem which may lead to redesignation as a nonattainment area.

(b) PLAN REVISIONS.—Maintenance provisions required by this section shall be updated every ten years and submitted to the Administrator for approval pursuant to section 110 and this part as a revision to the implementation plan.

Subpart 2—Additional Provisions Regarding Ozone Nonattainment Areas

CLASSIFICATION OF OZONE NONATTAINMENT AREAS

SEC. 181. (a) CLASSIFICATION BY OPERATION OF LAW.—Each area that did not meet the national primary ambient air quality standard for photochemical oxidants (hereinafter "ozone") as of the last calendar year ending before enactment of this subpart for which data are available is hereby classified by operation of law in one of the following categories based upon the percentage by which such standard is exceeded:

Area classification	*Amount by which standard exceeded*
Moderate ozone nonattainment area	*Not greater than 20 per centum*
Serious ozone nonattainment area	*More than 20 per centum but not more than 50 per centum*
Severe ozone nonattainment area	*More than 50 per centum but not more than 120 per centum*
Extreme ozone nonattainment area	*More than 120 per centum*

(b) DATA AND METHODS FOR CLASSIFICATION.—For purposes of determining the percentage by which the national primary ambient air quality standard for ozone is exceeded in any area—

(1) the most recent monitoring data available shall be used; and

(2) the same methods as are used under regulations of the Administrator for determining attainment of the standard shall

be applicable (including the design value, reference methods, and guidelines for interpretation of ozone air quality standards).

Not later than thirty days after the enactment of this subpart, the Administrator shall publish a notice of the percentages by which the national primary ambient air quality standard for ozone was exceeded in each area referred to in subsection (a).

(c) DEADLINES FOR ATTAINMENT.—The following deadlines apply to the ozone nonattainment areas classified in accordance with subsection (a):

	Applicable Attainment Date (in years after enactment of the Clean Air Act Amendments of 1989)
Moderate Area	*5 years*
Serious Area	*10 years*
Severe Area	*15 years*
Extreme Area	*20 years*

(d) REFERENCES TO TERMS.—Any reference in this subpart to a "moderate area", a "serious area" a "severe area", or an "extreme area" shall be considered a reference to a moderate ozone nonattainment area, a serious ozone nonattainment area, a severe ozone nonattainment area, or an extreme ozone nonattainment area as classified under this section.

REQUIREMENTS APPLICABLE TO ALL OZONE NONATTAINMENT AREAS

SEC. 182. (a) INVENTORIES.—Not later than one year after the date of enactment of this subpart in the case of each State that contains a nonattainment area or portion thereof classified pursuant to section 181(a), or in the case of a State containing an area subsequently classified nonattainment pursuant to section 107 and this subpart, within eighteen months of such classification, such State shall submit to the Administrator—

(1) for each such area, a comprehensive, accurate, current inventory of actual emissions of volatile organic compounds and oxides of nitrogen from all sources in such area. Such inventory shall be of emissions in the calendar year of enactment, or such other calendar year between 1987 and the year of enactment, inclusive, approved by the Administrator. Each such inventory shall be prepared in accordance with the guidance required to be published by the Administrator pursuant to section 108(g)(2), if such guidance is available. Revisions of each such inventory shall be submitted every three years thereafter until the area for which the inventory is prepared is redesignated attainment; and

(2)(A) a revision to the State implementation plan that contains a requirement that the owner or operator of each stationary source of oxides of nitrogen or volatile organic compounds within an ozone nonattainment area or portion thereof in such State provide the State with a statement in such form as the Administrator may prescribe (or the State may prescribe, if the Administrator does not) for classes or categories of sources, showing the actual emissions from that source during the previous calendar year of oxides of nitrogen and volatile organic compounds. The first such statement shall be submitted for the

calendar year in which the revision referred to in the first sentence of this subparagraph was submitted to the Administrator. Subsequent statements shall be submitted at least annually thereafter.

(B) The State may waive the application of subparagraph (A) to any class or category of stationary sources which emit less than twenty-five tons per year of oxides of nitrogen or volatile organic compounds if the State, in its submissions under paragraph (1), provides an inventory of emissions from such class or category of sources based on guidelines provided by the Administrator under section 108(g)(2) (relating to inventories).

(b) IMPLEMENTATION OF CURRENT REQUIREMENTS.—Each State containing an ozone nonattainment area or portion thereof shall—

(1) not later than eighteen months after the date of enactment of this subpart, fully implement all provisions of any implementation plan for the attainment of the ozone air quality standard for each such area or areas which have been approved by the Administrator prior to the date of enactment of this subpart, and

(2) within six months after the date of enactment of this subpart, submit a revision or revisions to the applicable implementation plan to include provisions to correct requirements in (or add requirements to) the plan concerning reasonably available control technology as were required under section 172(b) (as in effect immediately before the date of enactment of this subpart), including a requirement to implement within one year after submission reasonably available control technology with respect to all sources of volatile organic compounds in such area or areas covered by a control technique guideline issued before the date of enactment of this subpart.

(c) PERMIT REQUIREMENT.—

(1) Each State containing an area or portion thereof classified pursuant to section 181(a) or subsequently classified pursuant to section 107 and this subpart shall, not later than eighteen months after the date of such classification submit to the Administrator a revision to the implementation plan for each such area requiring an operating permit as provided in sections 172(a)(6) and 173(b) for each new or existing major stationary source of volatile organic compounds or oxides of nitrogen located within any such nonattainment area. It shall be unlawful to operate any such major stationary source without a permit issued pursuant to an approved implementation plan beginning thirty-six months after the date of enactment of this subpart.

(2) For the purpose of satisfying the permit program requirement of section 173(c) (pertaining to offsets), the ratio of volatile organic compounds emissions reductions to increased emissions of such compounds in serious nonattainment areas shall be at least 1.5 to 1 and in severe and extreme nonattainment areas, 2 to 1 and the ratio of emissions reductions of oxides of nitrogen to increases in such emissions in an extreme area shall be at least 2 to 1.

(d) AUTO REGISTRATION FEE.—Each State containing an area classified pursuant to section 181(a) or subsequently classified pursuant section 107 and this subpart shall, not later than eighteen

months after such classification, submit to the Administrator a revision to the implementation plan for each such area providing for the collection of a fee beginning not later than six months after such date of not less than $2 for each vehicle registered within such nonattainment area. Such fees shall be used by the responsible regulatory agencies to develop and implement air pollution control programs pursuant to section 110 and this part. If the Administrator determines that the fee provisions of the applicable implementation do not meet the requirements of this subsection or if the Administrator determines that the State or subdivision thereof is not administering and enforcing the fee required under this subsection, the Administrator shall collect such fees, which, notwithstanding section 3302(b) of title 31, United States Code, shall be deposited into a special fund of the Treasury and shall thereafter be available for appropriation to the Environmental Protection Agency to carry out activities under this Act.

(e) STATIONARY SOURCE EMISSION FEES.—Each State containing an area classified pursuant to section 181(a) or subsequently classified pursuant to section 107 and this subpart shall, not later than eighteen months after such classification submit to the Administrator a revision to the implementation plan for each such area providing for the collection of a fee beginning not later than six months after the date of submission to be imposed on the owner or operator of each major stationary source of volatile organic compounds or oxides of nitrogen emissions located within such area. The fee shall be not less than $75 for each ton emitted. All revenues from any fee collected under this subsection shall be used by the State (or local pollution control agency) to develop and implement air pollution control programs pursuant to section 110 and this part. If the Administrator determines that the fee provisions of the applicable implementation plan do not meet the requirements of this paragraph or if the Administrator determines that the State or subdivision thereof is not administering and enforcing the fee required under this paragraph, the Administrator shall collect such fees, which, notwithstanding section 3302(b) of title 31, United States Code, shall be deposited into a special fund of the Treasury and which shall thereafter be available for appropriation to carry out to the Environmental Protection Agency activities under this Act.

REQUIREMENTS FOR SPECIFIC CLASSES OF OZONE NONATTAINMENT AREAS

SEC. 183. (a) REQUIREMENTS FOR MODERATE AREAS.—Each State containing an area classified as a moderate nonattainment area pursuant to section 181(a) or subsequently so classified pursuant to section 107 of this subpart, shall, with respect to the moderate area, submit to the Administrator, by the dates provided, the following revisions to the applicable implementation plan:

(1) within one year of the date of classification, a revision that requires implementation, within one year of submission of such revision, of requirements in either paragraph (A) or (B)—

(A) an enhanced vehicle emissions control inspection and maintenance program to reduce in-use emissions of volatile organic compounds and oxides of nitrogen from motor vehi-

cles, which program shall include each of the following elements—

(i) require coverage of all light-duty vehicles registered in, at a minimum, each metropolitan statistical area (as defined by the Office of Management and Budget) with a population of one hundred thousand or more according to the 1980 Census,

(ii) direct inspection of components of vehicle emission control systems (including evidence of misfueling) and, where such components have been rendered inoperative, the repair or replacement of such components,

(iii) computerized emission analyzers,

(iv) if a provision waiving the requirements for repairing the emission control system in the event of failure is included, a provision that such waiver shall apply only when the costs of repair exceed $200,

(v) enforcement through denial of vehicle registration (except for any program in operation prior to the effective date of this section whose enforcement mechanism is demonstrated to the Administrator to be more effective than the applicable vehicle registration program in assuring that non-complying vehicles are not operated on public roads), and

(vi) any requirements the Administrator may prescribe under section 202(j)(3) (pertaining to onboard emission diagnostic systems), or

(B) a requirement that all persons within the area transferring gasoline to a motor vehicle fuel tank from a gasoline dispensing system use a fill nozzle designed to (i) prevent discharge of hydrocarbon vapors into the ambient air, (ii) direct vapor displaced from the automotive fuel system to a system where organic compounds in the displaced vapor are recovered, and (iii) prevent vehicle fuel tank overflows or spillage on fill nozzle disconnect. The requirement of this subparagraph shall apply only to facilities which sell more than twenty thousand gallons of gasoline per month. The Administrator may revise or waive the requirements of this subparagraph, as appropriate, after such time as the Administrator determines that onboard emissions control systems required under this Act are in widespread use throughout the motor vehicle fleet.

Each vehicle inspection and maintenance program required by this paragraph shall include such additional elements as are necessary to assure that the program would achieve a reduction in emissions of volatile organic compounds equivalent to a reduction of four thousand seven hundred tons of such emissions per million vehicles covered in the year of enactment of this subpart (if such program had been operating in such year). The Administrator may establish an alternative performance standard with respect to such programs for nonattainment areas located in California, if the Administrator finds that such alternative standard is necessary to reflect lower average emissions of volatile organic compounds from vehicles operating in such State. Any area which is already operating a vehicle emission *control inspection and maintenance program or for which the implementation plan, as of the date of enactment of this subpart, includes a specific schedule for implementation of such a program shall comply with subparagraph (A);*

(2) an ozone nonattainment area for which the design value is less than .13 parts per million in the year immediately preceding enactment of this subpart shall not be required to comply with the requirements of subsection (a)(1) (pertaining to inspection and maintenance and refueling programs) unless such compliance is needed to bring the area into attainment with the primary ambient air quality standard for ozone by the date specified in section 181(c). The design value shall be calculated according to the interpretation methodology issued by the Environmental Protection Agency most recently before the date of enactment of this subpart;

(3) within one year after the date of classification, a revision that contains a permit program which meets the requirements of section 172(a)(6), section 173, and title V.

(b) REQUIREMENTS FOR SERIOUS AREAS.—For the purposes of requirements applicable to areas under subsection (c) and this subsection and sections 172, 173, 176, or 184, major stationary sources or major emitting facilities of volatile organic compounds are sources or facilities that produce or have the potential to produce twenty-five tons or more per year of such compounds. Each State containing an area classified as a serious area pursuant to section 181(a) or subsequently so classified pursuant to section 107 and this subpart shall, with respect to the serious area, make the submissions described under subsection (a) and in addition submit to the Administrator the following revisions to the applicable implementation plan and other items:

(1) an inventory that meets the requirements of section 182(a)(1) and, where all or part of such area is in a metropolitan statistical area (MSA) or consolidated metropolitan statistical area (CMSA), includes emissions from all sources within such MSA or CMSA, whichever is applicable, plus the twenty-five-mile radius around such area;

(2) no later than one year after the date of classification, a revision to provide for, and a demonstration that the plan as revised will provide for, within three years after classification, emissions reductions of volatile organic compounds of 12 per centum from actual emissions in the calendar year of classification. Emissions reductions that will occur by the applicable deadline from measures required under either the applicable implementation plan or rules promulgated by the Administrator (other than rules promulgated under section 211(h)) may be credited toward the required 12 per centum reduction;

(3) no later than three years from the date of classification a revision which demonstrates, based on photochemical grid modeling or any other analytical method determined by the Administrator, in the Administrator's discretion, to be at least as effective, that the plan, as revised—

(A) will provide for attainment by the applicable attainment date; and

(B) will result in volatile organic compound emission reductions from emissions reported in the initial inventory required under section 182(a)(1) equal to 12 per centum, averaged over each consecutive three-year period beginning with the fourth year after the date of classification, and extending until the area attains the primary ambient air quality standard for ozone. Such demonstration shall explicitly quantify projections with respect to emissions and necessary emission reductions from motor vehicles, using estimates for growth in vehicle miles traveled, congestion levels, and other relevant parameters that are used by the agency or agencies responsible for transportation planning for the area. Emissions reductions may be credited towards the 12 per centum reduction requirement to the extent they will occur by the applicable deadline from measures required under either the applicable implementation plan or rules promulgated by the Administrator (other than rules promulgated under section 211(h)). Any area that achieves an actual reduction in emissions in excess of that required by this subparagraph, as determined by the Administrator, may credit such excess emissions reductions toward the next three-year reduction requirement period. The revision may provide that reductions in emissions of oxides of nitrogen (other than reductions attributable to Federal motor vehicle standards) may be substituted for the reductions of volatile organic compounds required by this subparagraph at no less than a one-for-one ratio (nitrogen oxides to volatile organic compounds) if a State demonstrates to the satisfaction of the Administrator that such reductions of oxides of nitrogen, together with remaining reductions of volatile organic compounds, would result in a reduction in ozone concentrations at least equivalent to that which would occur from the reductions in volatile organic compound emissions required by the first sentence of this subparagraph. A State may request, and the Administrator may provide, technical assistance in making this demonstration;

(4)(A) beginning one year after the date of classification, annual reports on measures adopted or implemented during the preceding calendar year and any failure to implement measures scheduled for implementation during such year;

(B) beginning with the fourth such report and in each third such report thereafter, a demonstration by the State as to whether current vehicle miles traveled, congestion levels and other relevant parameters are consistent with those used for the demonstration required in paragraph (2) or for emissions projections pursuant to paragraph (3)(B)(i). Where such parameters and emissions levels exceed the levels projected for purposes of the area's three-year emissions reduction demonstration, the State shall, within one year, develop and submit a revision to the applicable implementation plan that includes a transportation control measures program consisting of measures from, but not limited to, section 108(f) that will reduce emissions to levels that are consistent with emission levels projected in such demonstration. Such revision shall be developed in accordance with

guidance issued by the Administrator pursuant to section 108(e) and with the requirements of section 174(b) and shall include implementation and funding schedules that achieve expeditious emissions reductions in accordance with implementation plan projections;

(5) within one year of the date of classification, a revision that satisfies the requirements of subparagraphs (A) (pertaining to vehicle inspection and maintenance) and (B) (pertaining to vapor recovery during vehicle fueling) of subsection (a)(1);

(6) within twelve months of classification, a revision to require implementation of reasonably available control technology for all stationary sources of volatile organic compounds that are not covered by a control technique guideline or listed pursuant to section 185(a) and that have the potential to emit twenty-five tons or more of such compounds and for all stationary sources of oxides of nitrogen that have the potential to emit one hundred tons or more per year of such pollutant. Such revision shall require the implementation of such technology no later than two years after classification and, in the case of volatile organic compounds, shall provide that reductions of 80 per centum or more from uncontrolled levels be achieved unless the State determines for a category of sources that such level of reductions is not technologically or economically feasible, in which case the required reduction shall be the maximum that is technologically and economically feasible;

(7) within one year of the date of classification, a revision that provides that if the area has failed to attain the primary ozone air quality standard by the deadline applicable to the area pursuant to section 181, each major stationary source of volatile organic compounds located in the area shall pay a fee for each calendar year until such standard is attained of $5,000 per ton (to be adjusted annually for inflation consistent with changes in the Consumer Price Index) of volatile organic compounds actually emitted during each such calendar year in excess of 50 per centum of such compounds actually emitted (as reported in the statement required by section 182(a)(2)) in the calendar year such area was to have attained the primary ozone air quality standard.

(c) Requirements for Severe Areas.—Each State containing an area classified as a severe area pursuant to section 181(a) or subsequently so classified pursuant to section 107 and this subpart shall, with respect to the severe area, comply with the requirements of subsections (a) and (b) and in addition submit to the Administrator the following revisions to the applicable implementation plan and other items:

(1) within two years after the date of classification, a revision that identifies and adopts specific enforceable strategies and transportation control measures to offset any growth in emissions from growth in vehicle miles traveled or numbers of vehicle trips in such area and to attain reduction in motor vehicle emissions as necessary, in combination with other emission reduction requirements of this subpart, to comply with the requirements of subsection (b)(3)(B) (pertaining to periodic three-year emissions reduction requirements). The State shall consid-

er, at a minimum, measures specified in section 108(f) and if the State fails to include any such measure, the implementation plan shall contain an explanation of why such measure was not adopted and what emissions reduction measure was adopted to provide a comparable reduction in emissions, or reasons why such reduction is not necessary to meet the requirements of subsection (b)(3)(B) or to attain a national ambient air quality standard;

(2) within one year after the date of classification, a revision requiring employers in such area to implement programs to reduce work-related vehicle trips and miles traveled by employees. Such revision shall be developed in accordance with guidance issued by the Administrator pursuant to section 108(f) and shall, at a minimum, require that each employer of one hundred or more persons in such area increase average passenger occupancy per vehicle in commuting trips between home and the workplace during peak travel periods by not less than 25 per centum above the average vehicle occupancy for all such trips in the area at the time the revision is submitted. The guidance of the Administrator may specify average vehicle occupancy rates which vary for locations within a nonattainment area (suburban, center city, business district) or among nonattainment areas reflecting existing occupancy rates and the availability of high occupancy modes. The revision shall provide that each employer subject to a vehicle occupancy requirement shall submit a compliance plan within two years after the date the revision is submitted which shall convincingly demonstrate compliance with the requirements of this paragraph not later than four years after such date. An employer may demonstrate in such plan compliance with a vehicle occupancy rate less than 25 per centum greater than the average in the area, if (A) expenditures by the employer in implementing the compliance plan are equal to or greater than the cost of providing each employee with a parking space at the location of the workplace; and (B) compliance with a vehicle occupancy rate 25 per centum above the areawide average is not feasible at such cost.

(d) REQUIREMENTS FOR EXTREME AREAS.—

(1) When all or part of an extreme area is in a metropolitan statistical area (MSA) or consolidated metropolitan statistical area (CMSA), the boundaries of the extreme area for the purposes of this subpart shall be defined, by operation of law, as the boundary of such MSA or CMSA, as applicable, plus twenty-five miles. If a State demonstrates to the satisfaction of the Administrator within sixty days of such designation that with respect to a portion of such area,

(A) sources in that portion do not contribute to violations of the standards, and

(B) there is a geographical basis for excluding that portion,

the Administrator may approve a State's request to exclude such portion from the nonattainment area. The Administrator shall determine whether or not to exclude such portion within sixty days of receiving the State's request.

(2) For the purpose of requirements applicable to extreme areas under this subsection and sections 172, 173, 176, or 184, major stationary sources or major emitting facilities of volatile organic compounds are sources or facilities that produce or have the potential to produce ten tons or more per year of such compounds.

(3) Each State in which an extreme area or portion thereof is located shall, with respect to the extreme area, comply with the requirements of subsections (a), (b), and (c) and in addition submit to the Administrator revisions to the applicable implementation plan that comply with—

(A) subsection (b) (2) and (3) (pertaining to initial and periodic 12 per centum emission reduction requirements) except that in addition to the required reductions in emissions of volatile organic compounds, the State shall submit revisions providing for initial and triennial 12 per centum reductions in emissions of oxides of nitrogen; and

(B) subsection (b)(6) (pertaining to reasonably available control technology) except that the requirements therein shall apply to all stationary sources that have the potential to emit ten tons or more per year of volatile organic compounds and to all stationary sources that have the potential to emit ten tons or more per year of oxides of nitrogen.

(e) Certain Non-Self-Generating Areas.—

(1) Notwithstanding any other provision of section 181 or this section, a State containing an ozone nonattainment area that does not include and is not adjacent to any part of a metropolitan statistical area or, where one exists, a consolidated metropolitan statistical area (as defined by the Office of Management and Budget), which area is determined by the Administrator to be non-self-generating within the meaning of paragraph (2), shall be treated by operation of law as satisfying the requirements of this section if it complies with regulations promulgated by the Administrator. Such regulations shall be promulgated no later than January 1, 1991, and shall, at a minimum, require compliance with the provisions of section 182 and such other measures as the Administrator determines appropriate to provide for the attainment and maintenance of the national ambient air quality standard for ozone.

(2) The Administrator may determine an ozone nonattainment area to be non-self-generating if the Administrator finds that sources of volatile organic compounds and oxides of nitrogen emissions within the area do not make a significant contribution to the ozone concentrations measured in the area or in other areas.

FAILURE TO COMPLY OR ATTAIN

Sec. 184. (a) Failure to Submit an Approvable Plan.—Whenever a State fails to make a plan submission or revision required for a nonattainment area within such State under this subpart, or the Administrator disapproves such plan or revision in whole or significant part, the Administrator—

(1) shall, with respect to such area, impose the prohibition of section 176(a)(1) (pertaining to new source construction);

(2) shall notify the Secretary of Transportation who shall impose the prohibition of section 176(a)(2) (pertaining to transportation funding); and

(3) may withhold funds as provided under section 176(a)(3) (pertaining to air pollution control program grants).

(b) Failure to Implement a Plan.—Whenever any requirement of an approved plan (or approved part of a plan) is not being implemented, the Administrator, with respect to the area (or areas) in which such requirement is not being implemented—

(1) shall impose the prohibition of section 176(a)(1) (pertaining to new source construction);

(2) shall notify the Secretary of Transportation who shall impose the prohibition of section 176(a)(2) (pertaining to transportation funding); and

(3) may withhold funds as provided under section 176(a)(3) (pertaining to air pollution control program grants).

(c) Failure to Achieve Required Emissions Reductions.—

(1) Whenever an ozone nonattainment area fails to achieve the emissions reductions required under section 183(b) (2) or (3)(B), the Administrator shall—

(A) impose the prohibition of section 176(a)(1) (pertaining to new source construction) and shall notify the Secretary of Transportation who shall impose the prohibition of section 176(a)(2) (pertaining to transportation funding); and

(B) perform an annual audit, until such area achieves the required emissions reductions, of the plan and its implementation in such area to determine the reasons the plan is not achieving the required reductions.

(2) Whenever an ozone nonattainment area fails to achieve the emissions reductions required under section 183(b) (2) or (3)(B), the Administrator may, in the Administrator's discretion—

(A) lower the quantity of emissions of volatile organic compounds or oxides of nitrogen, or both, that, for such area, defines a source as a major stationary source;

(B) require, in the case of an area listed as serious under section 181(a), that such area comply with the provisions of section 183(c) (relating to severe areas) and in the case of an area listed as severe under section 181(a), that such area comply with the provisions of section 183(d) (relating to extreme areas).

(d) Failure to Attain.—For any ozone nonattainment area that fails to attain the primary ozone air quality standard by the date applicable to such area pursuant to section 181, the Administrator shall—

(1) in the case of a moderate area reclassify such area as a serious area, in the case of a serious area, reclassify such area as a severe area, and in the case of a severe area, reclassify such area as an extreme area. From the date of reclassification each such area shall be subject to the provisions of this subpart, including the attainment date, that are applicable to the classification to which the area has been reclassified; and

(2) in the case of a serious, severe, or extreme area, assure that the provisions of the implementation plan required by section 183(b)(7) (pertaining to emissions fees for major stationary sources) are enforced.

ADDITIONAL FEDERAL MEASURES TO CONTROL OZONE POLLUTION

SEC. 185. (a) CONTROL TECHNIQUES GUIDELINES.—

(1) Not later than six months after the date of enactment of this subpart, the Administrator shall publish a list of at least twelve categories of stationary sources for which control technique guidelines, in accordance with subsection 108(b), have not previously been published and which the Administrator considers to make the most significant contribution to the formation of ozone air pollution. The categories shall be divided into three groups (with an equal number of categories in each group) and the Administrator shall establish a schedule for publication of guidelines for each of such groups at the time of publication of the list of categories.

(2) The Administrator shall publish control technique guidelines for sources within the categories listed under paragraph (1). The guidelines shall be published for the first group of such sources within the first eighteen months after publication of the list and for at least one additional group in each succeeding eighteen-month period until guidelines have been published for all listed categories.

(3) Within thirty-six months after the date of enactment of this subpart, and every four years thereafter, the Administrator shall review and, if necessary, update control technology guidelines including those issued before the enactment of this subpart. The Administrator may publish such additional guidelines as the Administrator deems necessary.

(b) VOLATILE ORGANIC COMPOUNDS EMISSIONS FROM LOADING AND UNLOADING OF CERTAIN VESSELS.—Within two years after the enactment of this subpart, the Administrator shall publish a control technique guideline, in accordance with section 108(c), regarding control of volatile organic compound emissions from the loading or unloading of petroleum products on to or from vessels. Such emissions shall be considered to be direct emissions of the onshore terminal for all purposes under this Act.

(c) CONSUMER OR COMMERCIAL PRODUCTS.—

(1) Within two years after the date of enactment of this subpart, the Administrator shall submit to the Congress a final report on emissions of ozone precursors from consumer or commercial products which emit significant quantities of ozone precursors, and include recommendations for the control of such emissions.

(2)(A) Within one year of submission of the report required under paragraph (1), the Administrator shall propose, and within two years of such submission shall promulgate, regulations to aid in the attainment of the ozone ambient air quality standard by decreasing emissions of ozone precursors from classes or categories of consumer or commercial products. Such regulations shall be designed to achieve reductions from the selected

product categories to a level equal to the level that would be achieved by the application of reasonably available controls to each such class or category of consumer or commercial products and shall, at a minimum, achieve, within three years after promulgation, reductions in nationwide emissions of volatile organic compounds of three per centum below the level of such emissions in the calendar year of enactment of this subpart.

(B) Such regulations may include any system or systems of implementation as the Administrator may deem appropriate, including but not limited to requirements for registration and labeling, self-monitoring and reporting, prohibitions, limitations, or fees concerning the manufacture, processing, distributions, use, consumption, or disposal of the product.

(C) The regulations may exempt health-use products for which the Administrator determines there are not suitable substitutes.

(D) Any fees collected under such regulations shall be deposited in a special fund in the United States Treasury which shall thereafter be available for appropriation, to remain available until expended, to carry out activities of the Environmental Protection Agency under this Act.

(3) Any standard established under this subsection shall be treated, for purposes of sections 113, 114, 115, 120, and 304, as a standard under section 111.

(4) The Administrator may, pursuant to regulations, delegate to any State that so requests, administration and enforcement of the regulations promulgated under paragraph (2).

(5) For the purposes of this subsection—

(A) the term "reasonably available controls" means the degree of emissions reduction that the Administrator determines, on the basis of technological and economic feasibility, health, environmental, and energy impacts, is reasonably achievable through the application of any equipment, processes, systems or techniques, including, but not limited to, chemical reformulation, product or feedstock substitution, repackaging, or directions for use, consumption, storage, or disposal;

(B) the term "consumer or commercial products" means any substance, product, or article (including any container or packaging) held by any person, the use, consumption, storage, disposal, destruction, or decomposition of which may result in the release of ozone precursors. The term does not include fuels or fuel additives as defined under section 211; and

(C) the term "ozone precursors" means pollutants that contribute to the ambient air concentrations of ozone.

(d) HAZARDOUS WASTE FACILITIES.—The Administrator shall, not later than March 31, 1991, and after notice and opportunity for public comment, promulgate regulations pursuant to section 3004(n) of the Solid Waste Disposal Act controlling emissions of volatile organic compounds and other pollutants from treatment, storage, and disposal facilities subject to such Act which shall, at a minimum, achieve within three years after promulgation, reductions in nationwide emissions of volatile organic compounds of 4 per centum below

the level of such emissions in the calendar year of enactment of this subpart.

CONTROL OF INTERSTATE OZONE AIR POLLUTION

SEC. 186. (a) OZONE TRANSPORT REGIONS.—The area comprising the States of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Virginia, and the consolidated metropolitan statistical area including the District of Columbia is established as an ozone transport region. The Administrator may add any State or portion of a State to any region established under this subsection or establish other ozone transport regions, consisting of two or more States, when the Administrator determines that the interstate transport of air pollutants from such State or States significantly contributes to concentrations of ozone or ozone precursors in any nonattainment area in another State classified under section 181(a) as a serious, severe, or extreme area for ozone. The ozone transport commission established under subsection (b) for any ozone transport region may remove any State or portion of a State from the region if the commission determines that the control of emissions in that State or portion of a State pursuant to this section will not significantly contribute to the attainment of the primary ambient air quality standard for ozone in any nonattainment area.

(b) OZONE TRANSPORT COMMISSIONS.—Not later than six months after enactment of this subpart, the Administrator shall establish an ozone transport commission for the ozone transport region established by the first sentence of subsection (a). Not later than three months after the establishment of any other ozone transport region, the Administrator shall establish an ozone transport commission for the region. Each ozone transport commission shall be comprised of the following members—

(1) an air pollution control official representing each State in the region, appointed by the Governor or as provided under State law;

(2) the Administrator (or an employee designated by the Administrator from the headquarters office of the Environmental Protection Agency); and

(3) the Regional Administrator (or an employee designated by the Regional Administrator) for each Environmental Protection Agency regional office for each Environmental Protection Agency region affected by the ozone transport region concerned.

Decisions of each ozone transport commission may be made only by a majority vote of all members other than the Regional Administrators (or designees thereof).

(c) PLAN PROVISIONS FOR STATES IN OZONE TRANSPORT REGIONS.—Not later than two years after the enactment of this subpart (or nine months after the subsequent inclusion of a State in an established ozone transport region), each State included within an ozone transport region shall submit a State implementation plan or revision thereof to the Administrator which requires the following—

(1) that each area in such State that is in an ozone transport region, that is not a nonattainment area, and that is a metropolitan statistical area or part thereof with a population of

100,000 or more, comply with the provisions of section 183(a)(1)(A) (pertaining to vehicle inspection and maintenance programs);

(2) implementation of reasonably available control technology with respect to—

(A) all sources of volatile organic compounds in the State covered by a control techniques guideline issued before the date of enactment of this subpart.

(B) all sources of volatile organic compounds or oxides of nitrogen in the State covered by a control techniques guideline issued by the Administrator after the date of enactment of this subpart, and

(C) all stationary sources that have the potential to emit one hundred or more tons of volatile organic compounds and that are not covered by a control technique guideline or listed pursuant to section 185(a); and

(3) a requirement that all persons within the State transferring gasoline to a motor vehicle fuel tank from a gasoline dispensing system use a fill nozzle designed to (i) prevent discharge of hydrocarbon vapors into the ambient air, (ii) direct vapor displaced from the automotive fuel system to a system where organic compounds in the displaced vapor are recovered, and (iii) prevent vehicle fuel tank overflows or spillage on fill nozzle disconnect. The requirement of this subparagraph shall apply only to facilities which sell more than twenty thousand gallons of gasoline per month. The Administrator may revise or waive the requirements of this subparagraph, as appropriate, after such time as the Administrator determines that onboard emissions control systems required under this Act are in widespread use throughout the motor vehicle fleet.

(d) ADDITIONAL CONTROL MEASURES.—

(1) Upon petition of any State within an ozone transport region, the commission may, after notice and opportunity for comment, develop a plan of additional control measures to be applied within all or a part of such transport region if the commission determines such measures are necessary to bring any area in such region into attainment by the dates provided by this subpart. The commission shall transmit such plan to the Administrator.

(2) Whenever the Administrator receives a plan prepared by a commission pursuant to paragraph (1) (the date of receipt of which is hereinafter in this section referred to as the receipt date), the Administrator shall—

(A) immediately publish in the Federal Register a notice stating that the plan is available and that written data, views, or comments on the plan may be submitted to the Administrator within ninety days beginning on the receipt date; and

(B) commence a review of the plan to determine whether the control measures in the plan are necessary to bring any area in such region into attainment by the dates provided by this subpart and are otherwise consistent with this Act.

(3) In undertaking the review required under paragraph (2)(B), the Administrator shall consult with members of the

commission of the affected States and shall take into account the data, views and comments received pursuant to paragraph (2)(A).

(4) Within one hundred and twenty days after the receipt date, the Administrator shall determine whether to approve, disapprove, or partially disapprove and partially approve the plan; shall notify the commission in writing of such approval, disapproval or partial disapproval; and shall publish such determination in the Federal Register. If the Administrator fails to act within one hundred and twenty days, the plan shall be deemed approved. If the Administrator disapproves or partially disapproves a plan, the Administrator shall specify—

(A) why any disapproved additional control measures are not necessary to bring any area in such region into attainment by the dates provided by this subpart or are otherwise not consistent with the Act; and

(B) recommendations concerning actions that could be taken by the commission to conform the disapproved portion of the plan to the requirements of this section.

(5) Upon approval or partial approval of a plan submitted by a commission, the Administrator shall issue to each State which is included in the transport region and to which a requirement of the approved plan applies, a finding under section 110(d)(4) that the implementation plan for such State is inadequate to meet the requirements of section 110(c)(4). Such finding shall require each such State to revise its implementation plan to include the approved additional control measures within one year after the finding is issued.

(e) EXEMPT AREAS.—(1) Upon petition of any State within an ozone transport region, the Administrator, after seeking written views of the commission and after publishing a written finding in the Federal Register, may exempt any area within such State from one or more of the requirements of subsection (c) if the State demonstrates to the satisfaction of the Administrator that stationary or mobile sources within the area do not contribute to nonattainment in any other area in such region. The Administrator shall make a determination under this paragraph within nine months following receipt of a petition.

(2) The requirements of subsection (c)(3) shall not apply to any State that contains no ozone nonattainment area or portion thereof unless the Administrator determines that such requirements are necessary to achieve attainment in any area in an adjoining State or the Governor of the State containing no ozone nonattainment area determines, pursuant to State law, that such requirements should apply in such State.

(f) PETITIONS.—Any State or political subdivision may petition the Administrator to make a determination that any other State or portion thereof should be included within an ozone transport region under this section. The petitioning State shall include with such petition such evidence as is available to it regarding the contribution made by sources located in (or operating in) the State (or portion thereof) which is the subject of the petition to ozone concentrations in the petitioning State. Within one hundred and twenty days after receipt of any petition under this subsection and after a public hear-

ing, the Administrator shall include the State (or portion thereof) within an ozone transport region or deny the petition.

(g) Best Available Air Quality Monitoring and Modeling.—For purposes of this section, not later than six months after the enactment of subpart, the Administrator shall promulgate criteria for purposes of determining the contribution of sources in one area to concentrations of ozone in another area which is a nonattainment area for ozone. Such criteria shall require that the best available air quality monitoring and modeling techniques be used for purposes of making such determinations.

Subpart 3—Additional Provisions Regarding Carbon Monoxide Nonattainment Areas

CLASSIFICATION OF CARBON MONOXIDE NONATTAINMENT AREAS

Sec. 187. (a) Classification by Operation of Law.—Each area which did not meet the national primary ambient air quality standard for carbon monoxide averaged over an eight-hour period as of the last calendar year ending before enactment of this subpart for which data is available is hereby classified by operation of law in one of the following categories based upon the percentage by which the standard was exceeded in that area:

Area classification	*Percentage exceedance*
Moderate	*Not Greater than 55 per centum*
Serious	*Greater than 55 per centum.*

Any reference in this subpart to a "moderate nonattainment area" or a "serious nonattainment area" shall be considered a reference to a moderate or serious carbon monoxide nonattainment area as classified under this subsection (or as subsequently reclassified under this subpart). Any reference in this subpart to the "carbon monoxide air quality standard" shall be considered a reference to the national primary ambient air quality standard for carbon monoxide averaged over an eight-hour period.

(b) Data and Methods for Classification.—For purposes of calculating the percentage by which the carbon monoxide air quality standard is exceeded in any area—

(1) the most recent monitoring data available shall be used; and

(2) the same methods as are used under regulations of the Administrator for purposes of determining attainment of the standard shall be applicable.

Not later than thirty days after the date of enactment of this subpart the Administrator shall publish a notice identifying the percentage by which each area referred to in subsection (a) exceeds the carbon monoxide air quality standard and the classification of each area as moderate or serious.

(c) Deadlines for Attainment.—The following deadlines apply to the carbon monoxide nonattainment areas classified in accordance with subsection (a)—

Area Classification	*Applicable attainment date (in years after enactment of this subpart)*
Moderate	*5 years*
Serious	*10 years.*

(d) N*EW* S*TANDARD.—If the Administrator revises the carbon monoxide air quality standard after the enactment of this subpart, the Administrator shall, within six months after the revision, promulgate requirements applicable to all areas which have not attained the revised standard and shall require the submission of implementation plans or revisions to such plans for such areas within twenty-four months after the revision of the standard. Such requirements shall provide for controls which are not less stringent than the controls applicable to areas classified under subsection (a) and shall provide for attainment of such revised standard according to a schedule which is comparable to that specified in subsection (c).*

REQUIREMENTS APPLICABLE TO ALL CARBON MONOXIDE NONATTAINMENT AREAS

*S*EC*. 188. (a)* I*NVENTORIES.—Each State containing a nonattainment area classified pursuant to section 187(a) shall, not later than one year after the date of enactment of this subpart and every three years thereafter, submit an inventory of carbon monoxide emissions from stationary and mobile sources located within each such area as provided in the guidelines issued by the Administrator pursuant to section 108(g). The initial inventory shall report emissions occurring in the calendar year immediately preceding enactment of this section or the subsequent year. Any area subsequently classified nonattainment pursuant to section 107 and this subpart shall submit (and update as provided in this subsection) carbon monoxide emissions inventories beginning eighteen months after the date of classification. Guidance for inventory preparation published by the Administrator pursuant to section 108(g) shall contain factors for estimating carbon monoxide emissions from wood stoves and other small combustion sources.*

(b) M*ONITORING.—The enhanced monitoring program required by section 108(g) shall include the use of mobile monitors for carbon monoxide to determine the geographic extent of any nonattainment problem for such pollutant within an area. Monitoring pursuant to such guidelines shall be commenced in all areas classified pursuant to section 187(a) or subsequently pursuant to section 107 and this subpart not later than eighteen months after such classification. The Administrator may require through guidance or by rule the use of mobile monitoring devices for carbon monoxide in areas designated as attainment areas.*

(c) E*XISTING* C*OMMITMENTS.—*

(1) Not later than eighteen months after the date of enactment of this section each State containing an area classified nonattainment pursuant to section 187(a) shall fully implement all provisions of any implementation plan for the attainment of the carbon monoxide air quality standard for such area or areas which have been submitted to the Administrator for approval (whether or not approved) prior to the date of enactment of this section.

(2) Each State containing an area classified pursuant to section 187(a) shall promptly and fully implement any additional measures not previously proposed by the State but required by subpart 1.

(d) AUTO REGISTRATION FEE.—*Each State containing an area classified pursuant to section 187(a) or which contains an area subsequently classified pursuant to section 107 and this subpart shall not later than eighteen months after such classification submit to the Administrator for approval a revision to the implementation plan for each such area providing for the collection of a fee beginning not later than six months after such date of not less than $2 for each vehicle registered within such nonattainment area or areas. The requirement of this section shall not be in addition to any similar fee requirement imposed on vehicle registrations in such area under subpart 2. All revenues from any fee collected under this subsection shall be used by the State (or by a local air pollution control agency) to fund air pollution control programs pursuant to section 110 and this part. Such use may include expenditures for the planning, development and implementation by the State (or by a local air pollution control agency) of control measures in such nonattainment area or areas. If the Administrator determines that the fee provisions of the applicable implementation plan do not meet the requirements of this subsection or if the Administrator determines that such agency is not administering and enforcing the fee required under this subsection, the Administrator shall collect such fees, which, notwithstanding section 3302(b) of title 31, United States Code, shall be deposited into a special fund of the Treasury and shall thereafter be available for appropriation to the Environmental Protection Agency to carry out activities under this Act.*

(e) STATIONARY SOURCE EMISSIONS FEE.—*Each State containing an area classified pursuant to section 187(a) or which contains an area subsequently classified pursuant to section 107 and this subpart shall not later than eighteen months after such classification submit to the Administrator a revision to the implementation plan for each such area providing for the collection of a fee beginning not later than six months after the date of submission to be imposed on the owner or operator of each major stationary source of carbon monoxide emissions located within such area. The fee shall be not less than $75 for each ton of carbon monoxide emissions. The owner or operator of each such source shall be liable to the State for payment of such fee. The liability for fees to be paid under this subsection shall be in addition to liability for any similar fees imposed under other provisions of this Act. All revenues from any fee collected under this subsection shall be used by the State (or local pollution control agency) to develop and implement air pollution control programs pursuant to section 110 and this part. Such use may include expenditures by the State (or by a local air pollution control agency) for the planning, development and implementation of control measures in such nonattainment area or areas.*

(f) PERMIT REQUIREMENT.—

(1) Each State containing an area classified pursuant to section 187(a) or which contains an area subsequently classified pursuant to section 107 and this subpart shall not later than eighteen months after the date of such classification submit to the Administrator for approval a revision to the implementation plan for each such area requiring an operating permit as provided in sections 172(a)(6) and 173(b) for each new or existing major stationary source of carbon monoxide emissions locat-

ed within any such nonattainment areas. It shall be unlawful to operate a major source of carbon monoxide emissions without a permit issued pursuant to an approved implementation plan beginning thirty-six months after the date of enactment of this subpart.

(2) Each permit issued pursuant to this subsection shall require the installation of continuous emission monitoring for carbon monoxide emissions from the source.

(3)(A) For purposes of this part a major stationary source of carbon monoxide emissions is any stationary source located or to be located in a moderate nonattainment area which emits or has the potential to emit fifty tons or more of carbon monoxide per year or any such source located or to be located in a serious nonattainment area which emits or has the potential to emit twenty-five tons or more of carbon monoxide per year.

(B) For the purpose of satisfying the requirement of section 173(c) (pertaining to offsets) the ratio of emissions reductions to increased emissions in serious nonattainment areas shall be at least 1.5 to 1.

(g) ATTAINMENT DEMONSTRATION AND MILESTONES.—

(1) Each State containing a moderate or serious nonattainment area shall, after notice and opportunity for public comment but not later than twenty-four months after such area has been designated nonattainment, submit to the Administrator for approval revisions to the implementation plan for each such area which demonstrate, as provided in section 110 and this part, attainment of the carbon monoxide air quality standard by the deadline for attainment for such area or areas as provided in section 187(c).

(2)(A) Notwithstanding the provisions of paragraph (1), revisions demonstrating attainment under this subsection shall not be required for any moderate nonattainment area for which the design value in the most recent calendar year immediately preceding enactment of this section did not exceed the carbon monoxide air quality standard by more than 10 per centum: Provided, That, within three months after the date of enactment of this subpart the Governor of such State submits to the Administrator a detailed statement of the measures to be undertaken in such area which will assure attainment of the carbon monoxide air quality standard by not later than thirty-six months after such date of enactment.

(B) In the event that a moderate nonattainment area for which an attainment demonstration has not been submitted pursuant to subparagraph (A) does not attain the carbon monoxide air quality standard by the date thirty-six months after the date of enactment of this subpart, the State in which such area is located shall, after notice and opportunity for public comment, submit within an additional twelve-month period revisions to the implementation plan for the area making such demonstration and such area shall be subject to all of the requirements of this subpart applicable to moderate nonattainment areas including implementation of a vehicle inspection and maintenance program pursuant to subsection (i) and the deadlines for attainment established by section 187(c).

(3) Revisions demonstrating attainment submitted to the Administrator for approval under this subsection shall contain quantitative milestones to be achieved in each year in which an inventory is required under subsection (a) until the area is reclassified attainment and which demonstrate, as defined in section 171(1), reasonable further progress toward attainment by the date applicable to the area under section 187(c). Milestones proposed for inclusion in an implementation plan under this paragraph may be stated as—

(A) reductions in vehicle miles traveled or vehicle trips in the nonattainment area, or both, during periods when the standard is likely to be violated;

(B) reductions in tons of emissions of carbon monoxide emitted annually in the nonattainment area;

(C) reductions in the design value for carbon monoxide averaged over an eight-hour period for the area;

(D) reductions in the number of exceedances of the national carbon monoxide air quality standard which would be expected to occur each year; or

(E) any combination of the above.

(4) Revisions demonstrating attainment submitted to the Administrator for approval under this subsection shall contain one or more contingency measures sufficient to reduce (singly or in combination) carbon monoxide emissions in the nonattainment area as reported in the most recent inventory by not less than 5 per centum for moderate nonattainment areas and not less than 10 per centum for serious nonattainment areas. The revisions shall provide for automatic implementation of the measures in the event the area does not attain the carbon monoxide air quality standard by the date applicable to the area as provided in section 187(c). Contingency measures may be implemented only in part if all measures are not necessary to assure attainment of such standard as determined by the Administrator. Implementation of contingency measures shall not be delayed by any extension granted pursuant to section 190(d)(1).

(5) The Administrator may not approve any revisions submitted pursuant to this subsection unless such revisions taken as a whole convincingly demonstrate attainment by not later than the dates specified in section 187(c). Notwithstanding the provisions of this paragraph, the Administrator may order that any or all requirements contained in such revisions be implemented and enforced pending submission of additional revisions of the implementation plan which can be approved as demonstrating attainment of the carbon monoxide air quality standard by the dates applicable under section 187(c).

(h) CONTINUING AUDITS OF IMPLEMENTATION PLANS.—

(1) The Administrator shall conduct an audit of each implementation plan for carbon monoxide for each area designated nonattainment for the carbon monoxide air quality standard to determine whether the State (or local air pollution control agency) is adequately implementing and enforcing each provision of the plan and achieving the milestones established pursuant to subsection (g). Audits shall be conducted not less frequently than every three years and shall be scheduled, to the

extent practicable, in years immediately following the compilation of an inventory as provided by subsection (a).

(2) If the Administrator finds that any provision required by section 110, section 172(a) (1) through (10), section 173 or this subpart is not being adequately implemented and enforced, the Administrator shall promptly notify the State in which the area is located and shall impose the sanctions required by section 190 until such time as full implementation is achieved.

(3) If the Administrator finds that any milestone established pursuant to subsection (g) has not been achieved by the applicable date, the Administrator shall require the State in which the area is located to promptly submit revisions to its plan, including provisions which may be identified by the Administrator, assuring achievement of the milestone as expeditiously as practicable but not later than eighteen months after the date originally scheduled for achieving the milestone. The Administrator shall also impose the sanctions required by section 190 until such time as the milestone is achieved.

(i) VEHICLE INSPECTION AND MAINTENANCE PROGRAM.—Each State containing an area classified nonattainment pursuant to section 187(a) or which contains an area subsequently classified nonattainment and which is required to submit revisions to the implementation plan for such area demonstrating attainment pursuant to subsection (g) shall, not later than one year after the date of such classification, submit a revision to the applicable plan providing for implementation of a vehicle inspection and maintenance program which achieves carbon monoxide emissions reductions equivalent to a reduction of fifty-two thousand tons of such emissions per million vehicles covered in the year of enactment of this subpart (if the program had been operating in such year) and includes each of the elements in clauses (i) through (vi) of section 183(a)(1)(A).

(j) OXYGENATED FUELS.—Revisions demonstrating attainment submitted pursuant to subsection (g) shall contain provisions implementing and enforcing an oxygenated fuels program for each moderate or serious nonattainment area as provided in section 211(e).

REQUIREMENTS APPLICABLE TO SERIOUS CARBON MONOXIDE NONATTAINMENT AREAS

SEC. 189. (a) TRANSPORTATION CONTROL MEASURES.—Revisions demonstrating attainment submitted pursuant to section 188(g) for any serious nonattainment area shall contain a commitment to implement as expeditiously as practicable each of the transportation control measures specified in section 108(f) or a statement of the reasons for not including such measure in such revisions and an identification of other measures which will be taken in the area to obtain carbon monoxide emissions reductions equal to or greater than those which would have been achieved by implementation of such measure or measures, or reasons why such reduction is not necessary to meet the requirements of subsection 188(g)(3) or to attain a national ambient air quality standard.

(b) EMPLOYER RIDERSHIP PROGRAM.—Revisions demonstrating attainment submitted pursuant to section 188(g) for any serious nonattainment area shall contain provisions requiring employers in such

area to implement programs to reduce work-related vehicle trips and miles traveled by employees. Such revision shall be developed in accordance with guidance issued by the Administrator pursuant to section 108(f) and shall, at a minimum, require that each employer of one hundred or more persons increase average passenger occupancy per vehicle in commuting trips between home and the workplace during peak travel periods by not less than 25 per centum above the average vehicle occupancy for all such trips in the area at the time the revision is submitted. The guidance of the Administrator may specify vehicle occupancy rates which vary for locations within a nonattainment area (suburban, center city, business district) or among nonattainment areas reflecting existing occupancy rates and the availability of high occupancy modes. The revision shall provide that each employer subject to a vehicle occupancy requirement shall submit a compliance plan within two years after the date the revision is submitted which shall convincingly demonstrate compliance with the requirements of this subsection not later than four years after the date the revision is submitted. An employer may demonstrate in such plan compliance with a vehicle occupancy rate less than 25 per centum greater than the average in the area, if (1) expenditures by the employer in implementing the compliance plan are equal to or greater than the cost of providing each employee with a parking space at the location of the workplace; and (2) compliance with a vehicle occupancy rate 25 per centum above the areawide average is not feasible at such cost.

FAILURE TO COMPLY OR ATTAIN STANDARD

SEC. 190. (a) FAILURE TO SUBMIT AN APPROVABLE PLAN.—Whenever a State fails to make a plan submission or revision required for a nonattainment area within such State under this subpart, or the Administrator disapproves such plan in whole or significant part, the Administrator—

(1) shall, with respect to such area, impose the prohibition of section 176(a)(1) (pertaining to new source construction);

(2) shall notify the Secretary of Transportation who shall impose the prohibition of section 176(a)(2) (pertaining to transportation funding); and

(3) may withhold funds as provided under section 176(a)(3) (pertaining to air pollution control program grants).

(b) FAILURE TO IMPLEMENT A PLAN.—Whenever any requirement of an approved plan (or approved part of a plan) is not being implemented, the Administrator, with respect to the area, or areas, in which such requirement is not being implemented—

(1) shall impose the prohibition of section 176(a)(1) (pertaining to new source construction);

(2) shall notify the Secretary of Transportation who shall impose the prohibition of section 176(a)(2) (pertaining to transportation funding); and

(3) may withhold funds as provided under section 176(a)(3) (pertaining to air pollution control program grants).

(c) FAILURE TO ACHIEVE REQUIRED EMISSIONS REDUCTIONS.—Whenever a carbon monoxide nonattainment area fails to achieve emissions reductions or a milestone required under section 188(g),

the Administrator shall impose the prohibition of section 176(a)(1) (pertaining to new source construction) and shall notify the Secretary of Transportation who shall impose the prohibition of section 176(a)(2) (pertaining to transportation funding).

(d) Failure To Attain.—

(1) The Administrator shall reclassify any moderate nonattainment area failing to attain, as provided in section 187(c), the carbon monoxide air quality standard by the date five years after the date of enactment of this subpart as a serious nonattainment area, and such area shall from the time of reclassification be subject to the provisions of this subpart applicable to serious nonattainment areas. The Administrator may grant a one-year extension of the attainment date established by section 187(c) for a moderate nonattainment area before reclassification provided that the State has fully implemented all provisions in the implementation plan for the area and the area has not exceeded the carbon monoxide air quality standard by more than 10 per centum in the two years prior to such date. Not more than two one-year extensions may be granted to any area under this subsection. Within twelve months of reclassification, the State shall submit to the Administrator for approval revisions to the implementation plan for such area as may be necessary to comply with the requirements for serious nonattainment areas.

(2) In the case of an area classified as a serious nonattainment area in which the carbon monoxide air quality standard is not attained by the date provided in section 187(c), the State in which such area is located shall, after notice and opportunity for public comment, submit within twelve months after the applicable attainment deadline plan revisions which provide for attainment of the carbon monoxide air quality standard as provided in section 172(a), and, from the date of such submission until attainment, for an annual reduction in carbon monoxide emissions within the area of not less than 5 per centum of the amount of such emissions as reported in the most recent inventory prepared for such area.

Subpart 4—Additional Provisions for PM–10 Nonattainment Areas

ATTAINMENT DEADLINES FOR PM–10 NONATTAINMENT AREAS

Sec. 191. (a) Deadlines for Attainment.—State implementation plans required for any area not meeting the national ambient air quality standard for particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers (as measured by such method as the Administrator may determine) under this subpart shall demonstrate attainment as expeditiously as practicable but not later than the date five years after the date on which such area was designated nonattainment for PM–10. The attainment deadline for areas designated nonattainment pursuant to subparagraphs (A) or (B) of section 107(f)(4) shall not extend beyond December 31, 1993. The Administrator may extend the deadline applicable to any area under this subsection upon a showing by the State that—

(1) attainment within five years is impracticable because measures or technology to reduce PM–10 emissions are not

available or secondary aerosols account for a significant portion of PM–10 levels in such area;

(2) the State will implement all reasonably available control measures including all measures and control technology requirements described in any guidance issued by the Administrator pursuant to section 195; and

(3) reasonable further progress toward attainment will be achieved and demonstrated at regular intervals until the attainment date, as provided in section 192(e).

No extension provided under authority of this subsection may extend for a period beyond the date ten years after the date on which an area has been designated nonattainment.

(b) NEW STANDARD.—If the Administrator revises the particulate matter air quality standard after the date of enactment of this subpart, the Administrator shall, within six months after such revision, promulgate requirements applicable to all areas which have not attained the revised standard and shall require the submission of implementation plans or revisions to such plans for such areas within twenty-four months after the revision of the standard. Such requirements shall provide for controls which are not less stringent than the controls applicable to areas designated nonattainment for PM–10 and shall provide for attainment of such revised standard.

REQUIREMENTS APPLICABLE TO PM–10 NONATTAINMENT

SEC. 192. (a) INVENTORIES.—Each State containing an area designated nonattainment pursuant to section 107(f)(4) shall, not later than one year after the date of enactment of this subpart and every three years thereafter, submit an inventory of PM–10 (and PM–10 precursors) emissions from stationary and mobile sources located within each such area as provided in guidelines issued by the Administrator pursuant to section 108(g). Any area subsequently designated nonattainment pursuant to section 107 or this subpart shall submit (and update as provided in this subsection) such emissions inventories beginning eighteen months after the date of designation. Guidance for inventory preparation issued by the Administrator pursuant to section 108(g) shall contain factors for estimating PM–10 (and PM–10 precursors) emissions from area and natural sources.

(b) APPROVED SIPS.—Nothing in this section shall be interpreted to require preparation and submission of plan revisions for areas for which the State has submitted and the Administrator has approved a plan revision pursuant to regulations promulgated on August 7, 1987 (52 Federal Register 29383) if such plan revisions otherwise meet the requirements of this subpart.

(c) STATIONARY SOURCE EMISSIONS FEE.—Each State containing an area designated nonattainment for PM–10 pursuant to section 107(f)(4) or which contains an area subsequently designated nonattainment for PM–10 pursuant to section 107 or this subpart shall not later than eighteen months after such designation submit to the Administrator for approval a revision to the implementation plan for each such area providing for the collection of a fee beginning not later than six months after the date of submission to be imposed on the owner or operator of each major source of PM–10 or PM–10 precursor emissions located within such area. The fee shall be not less

than $75 for each ton of PM–10 or PM–10 precursor emissions. The owner or operator of the source shall be liable to the State for payment of such fee. The liability for fees imposed under this subsection shall be in addition to liability for any fees imposed under other provisions of this Act. All revenues from any fee collected under this subsection shall be used by the State (or local pollution control agency) to develop and implement air pollution control programs pursuant to section 110 and this part. If the Administrator determines that the fee provisions of the applicable implementation plan do not meet the requirements of this paragraph or if the Administrator determines that the State or subdivision thereof is not administering and enforcing the fee required under this paragraph, the Administrator shall collect such fees, which, notwithstanding section 3302(b) of title 31, United States Code, shall be deposited into a special fund of the Treasury and which shall thereafter be available for appropriation to the Environmental Protection Agency to carry out activities under this Act.

(d) PERMIT REQUIREMENTS.—

(1) Each State containing an area designated nonattainment for PM–10 pursuant to section 107(f)(4) or which contains an area subsequently designated nonattainment for PM–10 pursuant to section 107 or this subpart shall not later than eighteen months after the date of such designation submit to the Administrator for approval a revision to the implementation plan for each such area requiring an operating permit as provided in sections 172(a)(6) and 173(b) for each new or existing major source of PM–10 or PM–10 precursor emissions located within such areas. It shall be unlawful to operate a major source of PM–10 or PM–10 precursor emissions without a permit issued pursuant to an approved implementation plan beginning thirty-six months after the date of enactment of this subpart.

(2) Each permit issued pursuant to this subpart shall require monitoring of PM–10 or PM–10 precursor emissions from the permitted source not less frequently than monthly. The owner or operator shall periodically (but not later than twenty-four hours after any violation is detected) report the results of such monitoring to the State in which the source is located.

(3) For purposes of this part a major stationary source of PM–10 or PM–10 precursor emissions is any stationary source located or to be located in a PM–10 nonattainment area which emits or has the potential to emit fifty tons or more of PM–10 or pollutants which are precursors of PM–10 per year.

(4) For purposes of satisfying the requirement of section 173(c) (pertaining to offsets) the ratio of emissions reductions to increased emissions in areas granted an extension of the attainment deadline pursuant to section 191(a) shall be at least 1.5 to 1.

(e) ATTAINMENT DEMONSTRATION AND MILESTONES.—

(1) Each State containing an area designated nonattainment pursuant to section 107(f)(4) shall, after notice and opportunity for public comment but not later than twenty-four months after such designation, submit to the Administrator for approval revisions to the implementation plan for each such area which

demonstrate attainment of the PM–10 air quality standard by the date provided in section 191(a).

(2) Plan revisions demonstrating attainment submitted to the Administrator for approval under this subsection shall contain quantitative milestones which are to be achieved in each year in which an inventory is required under subsection (a) until the area is redesignated attainment and which demonstrate, as defined in section 171(1), reasonable further progress toward attainment by the date applicable under section 191(a).

(3) If a State includes in a plan revision an attainment date for an area which is after the date five years after the date of enactment of this subpart, the State shall commit to implementing each of the guidelines for control technology and measures which the Administrator promulgates pursuant to section 194 for each class or category of PM–10 or PM–10 precursor emission sources in the area. If the Administrator promulgates guidelines which are applicable to such classes and categories of sources after the date on which a plan revision is required by this subsection, the State shall further revise its plan within one year after the promulgation of such additional guidelines to provide for prompt implementation.

(4) Plan revisions demonstrating attainment submitted to the Administrator for approval under this subsection shall contain one or more contingency measures sufficient to reduce (singly or in combination) PM–10 or PM–10 precursor emissions in the nonattainment area as reported in the most recent inventory by not less than 10 per centum. The plan revision shall provide for automatic implementation of the contingency measures in the event the area does not attain the PM–10 air quality standard by the date established pursuant to section 191(a). Implementation of contingency measures shall not be delayed by any extension granted pursuant to section 193(d).

(5) The Administrator may not approve any revisions submitted pursuant to this subsection unless such revisions taken as a whole convincingly demonstrate attainment by not later than the dates applicable under section 191(a). Notwithstanding the provisions of this paragraph, the Administrator may order that any or all requirements contained in a plan revision be implemented and enforced pending submission of additional revisions of the implementation plan which can be approved as demonstrating attainment of the PM–10 air quality standard by the dates applicable under section 191(a).

(f) CONTINUING AUDITS OF IMPLEMENTATION PLANS.—

(1) The Administrator shall conduct an audit of each implementation plan for PM–10 for each area designated nonattainment pursuant to section 107(f)(4) to determine whether the State (or local pollution control agency) is adequately implementing and enforcing each provision of the plan and achieving the milestones established pursuant to subsection (e). Audits shall be conducted not less frequently than every three years and shall be scheduled, to the extent practicable, in years immediately following the compilation of an inventory as provided in subsection (a).

(2) If the Administrator finds that any provision required by section 110, subpart 1 or this subpart is not being adequately implemented and enforced, the Administrator shall promptly notify the State in which the area is located and shall impose sanctions required by section 193 until such time as full implementation is achieved.

(3) If the Administrator finds that any milestone established pursuant to subsection (e) has not been achieved by the applicable date, the Administrator shall require the State in which the area is located to promptly submit revisions to its plan, including provisions which may be identified by the Administrator, assuring achievement of the milestone as expeditiously as practicable but not later than eighteen months after the date originally scheduled. The Administrator shall also impose the sanctions required in section 194 until such time as the milestone is achieved.

(g) WAIVERS FOR CERTAIN AREAS.— The Administrator may, on a case-by-case basis, waive a requirement applicable to an area granted an extension under subsection 191(a) where he determines that nonanthropogenic sources of PM–10 are the principal cause of the violation of the PM–10 standard in the area, except that no requirement for reasonably available control measures or best available control measures applicable to anthropogenic sources which make a significant contribution to PM–10 levels and which are required pursuant to an extension granted under subsection 191(a) shall be waived. The Administrator may also waive a specific date for attainment of the standard where he determines that nonanthropogenic sources of PM–10 in combination with extraordinary meterological conditions contribute significantly to the violation of the PM–10 standard in the area.

FAILURE TO COMPLY OR ATTAIN STANDARD

SEC. 193. (a) FAILURE TO SUBMIT AN APPROVABLE PLAN.—Whenever a State fails to make a plan submission or revision required for a nonattainment area within such State under this subpart, or the Administrator disapproves such plan in whole or significant part, the Administrator—

(1) shall, with respect to such area, impose the prohibition of section 176(a)(1) (pertaining to new source construction);

(2) shall notify the Secretary of Transportation who shall impose the prohibition of section 176(a)(2) pertaining to transportation funding); and

(3) may withhold funds as provided under section 176(a)(3) (pertaining to air pollution control program grants).

(b) FAILURE TO IMPLEMENT A PLAN.—Whenever any requirement of an approved plan (or approved part of a plan) is not being implemented, the Administrator, with respect to the area (or areas) in which such requirement is not being implemented—

(1) shall impose the prohibition of section 176(a)(1) (pertaining to new source construction);

(2) shall notify the Secretary of Transportation who shall impose the prohibition of section 176(a)(2) (pertaining to transportation funding); and

(3) may withhold funds as provided under section 176(a)(3) (pertaining to air pollution control program grants).

(c) FAILURE TO ACHIEVE REQUIRED EMISSIONS REDUCTIONS.—Whenever a PM-10 nonattainment area fails to achieve emissions reductions of a milestone required under section 192(e), the Administrator shall impose the prohibition of section 176(a)(1) (pertaining to new source construction) and shall notify the Secretary of Transportation who shall impose the prohibition of section 176(a)(2) (pertaining to transportation funding).

(d) FAILURE TO ATTAIN.—

(1) The Administrator may, for any area, grant a one-year extension of the attainment date established pursuant to section 191(a) provided that—

(A) the State has fully implemented all provisions in the implementation plan for the area;

(B) the area does not exceed the PM-10 standard averaged annually; and

(C) the area has not exceeded the PM-10 air quality standard averaged over twenty-four hours by more than 10 per centum in the two years prior to such date.

Not more than two one-year extensions may be granted pursuant to the authority of this subsection.

(2) In the case of an area designated nonattainment pursuant to section 107(f)(4) in which the PM-10 standard is not attained by the date provided in section 191(a) (and considering any extension provided in paragraph (1)), the State in which such area is located shall, after notice and opportunity for public comment, submit within twelve months after the applicable attainment date, plan revisions which provide for attainment of the PM-10 air quality standard as provided in section 172(a), and, from the date of such submission until attainment, for an annual reduction in PM-10 or PM-10 precursor emissions within the area of not less than 5 per centum of the amount of such emissions as reported in the most recent inventory prepared for such area.

GUIDELINES FOR PM-10 SOURCES

SEC. 194. (a) INITIAL GUIDELINES.—Not later than eighteen months after the date of enactment of this section, the Administrator shall promulgate control technique guidelines with respect to reasonably available control technology and best available control technology for PM-10 (and PM-10 precursor) emissions from major stationary sources. At the same time, the Administrator shall publish guidelines with respect to reasonably available control measures and best available control measures for controlling PM-10 (and PM-10 precursor) emissions from area sources which cause or contribute to PM-10 nonattainment. At a minimum, guidelines published under this subsection shall include identification of technology and measures for combustion sources including wood smoke, prescribed burning for silviculture and agriculture, and urban fugitive dust.

(b) WOODSTOVE CURTAILMENT.—In addition to the guidelines required by subsection (a), the Administrator shall, not later than

twelve months after the date of enactment of this subpart, publish guidelines for the curtailment of residential wood burning as a reasonably available control measure under this subpart. Each State containing an area or areas which are designated nonattainment for PM-10 and for which residential wood burning contributes 20 per centum or more of PM-10 levels shall, not later than twenty-four months after the date of enactment of this subpart, submit a plan revision for each such area providing for the implementation of guidelines issued under this subsection. A State may elect to exempt wood heaters that have certified under the Environmental Protection Agency's Wood Heater Certification Program from any such curtailment.

(c) ADDITIONAL GUIDELINES.—Not later than six months after the date for submission of plans and plan revisions pursuant to section 192(e)(1), the Administrator shall publish a list of all other classes and categories of sources of PM-10 emissions which States have indicated will prevent attainment of the PM-10 air quality standard within five years after the date of enactment of this subpart because control technology is not available. Not later than forty-eight months after the date of enactment of this subpart, the Administrator shall publish control technique guidelines and guidelines for area sources (as provided in subsection (a)) for each such class or category.

TITLE II—EMISSION STANDARDS FOR MOVING SOURCES

SHORT TITLE

SEC. 201. This title may be cited as the "National Emission Standards Act."

PART A—MOTOR VEHICLE EMISSION AND FUEL STANDARDS

ESTABLISHMENT OF STANDARDS

SEC. 202. (a) * * *

(1) * * *

* * * * * * *

[(6) The Administrator shall determine the feasibility and desirability of requiring new motor vehicles to utilize onboard hydrocarbon control technology which would avoid the necessity of gasoline vapor recovery of uncontrolled emissions emanating from the fueling of motor vehicles. The Administrator shall compare the costs and effectiveness of such technology to that of implementing and maintaining vapor recovery systems (taking into consideration such factors as fuel economy, economic costs of such technology, administrative burdens, and equitable distribution of costs). If the Administrator finds that it is feasible and desirable to employ such technology, he shall, after consultation with the Secretary of Transportation with respect to motor vehicle safety, prescribe, by regulation, standards requiring the use of onboard hydrocarbon technology which shall not become effective until the introduction to the model year for which it would be feasible to implement such standards, taking into consideration compliance costs and the restraints of an adequate lead time for design and production.]

(6) The Administrator shall promulgate regulations applicable to all motor vehicles requiring that such vehicles be equipped with vehicle-based ('onboard') systems for control of evaporative emissions during refueling. Such regulations shall take effect, with respect to light duty vehicles, beginning in model year 1993, and, with respect to other vehicles, at the earliest date the Administrator determines is feasible, and shall require that such systems provide a minimum evaporative emission capture efficiency of 95 per centum.

* * * * * * *

(d) The Administrator shall prescribe regulations under which the useful life of vehicles and engines shall be determined for purposes of subsection (a)(1) of this section and section 207. Such regulations shall provide that useful life shall—

[(1) in the case of light duty vehicles and light duty vehicle engines, be a period of use of five years or of fifty thousand miles (or the equivalent), whichever first occurs;]

(1)(A) in the case of light duty vehicles and light duty vehicle engines manufactured during or before the 1994 model year, be a period of use of five years or of fifty thousand miles (or the equivalent), whichever first occurs;

(B) in the case of light duty vehicles and light duty engines manufactured in the model year 1995 and thereafter, be a period of use of ten years or one hundred thousand miles (or the equivalent), whichever first occurs;

(2) in the case of any other motor vehicle or motor vehicle engine (other than motorcycles or motorcycle engines) be a period of use set forth in paragraph (1) unless the Administrator determines that a period of use of greater duration or mileage is appropriate; and

(3) in the case of any motorcycle or motorcycle engine, be a period of use the Administrator shall determine.

* * * * * * *

(g) MODEL YEARS AFTER 1992.—(1) Effective with respect to the model years specified in tables 1 and 2 below, the regulations under subsection (a) applicable to emissions of nonmethane hydrocarbons (NMHC), total hydrocarbons (HC), oxides of nitrogen (NO_x), carbon monoxide (CO) and particulates (PM) from motor vehicles and motor vehicle engines in the classes specified in the tables shall contain standards which provide that emissions may not exceed the levels specified in the tables.

Table 1a.—EMISSIONS STANDARDS FOR GASOLINE-FUELED LIGHT DUTY VEHICLES

Pollutant	*Model years*	*Standards*
NMHC	*1993 through 2002*	*0.25 gpm.*
HC	*1993 through 2002*	*0.31 gpm.*
HC	*2003 and after*	*0.125 gpm.*
NO_x	*1993 through 2002*	*0.4 gpm.*
NO_x	*2003 and after*	*0.2 gpm.*
CO	*2003 and after*	*1.7 gpm.*

Table 1b.—Emissions Standards for Diesel-Fueled Light Duty Vehicles

Pollutant	*Model years*	*Standards*
NMHC	*1993 through 2002*	*0.25 gpm.*
HC	*1993 through 2002*	*0.31 gpm.*
HC	*2003 and after*	*0.125 gpm.*
NO_x	*1991 through 2002*	*1.0 gpm.*
NO_x	*2003 and after*	*0.7 gpm.*
CO	*2003 and after*	*1.7 gpm.*
PM	*1993 and after*	*0.08 gpm.*

Table 2.—Emission Standards for Gasoline and Diesel-Fueled Trucks and Buses

Vehicle or engine type	*Pollutant*	*Model years*	*Standard* [1]
Trucks (3,750 lbs or more but less than 5,750 lbs, loaded vehicle weight).	*NMHC*	*1995 and after*	*0.32 gpm.*
	HC	*1995 and after*	*0.38 gpm.*
	NO_x	*1995 and after*	*0.7 gpm.*
	CO	*1995 and after*	*4.4 gpm.*
Trucks (5,750 lbs loaded vehicle weight or more but less than 8500 lbs GVW).	*NMHC*	*1995 and after*	*0.39 gpm.*
	HC	*1995 and after*	*0.46 gpm.*
	NO_x	*1995 and after*	*1.1 gpm.*
	CO	*1995 and after*	*5.0 gpm.*
	PM	*1995 and after*	*0.12 gpm.*
Heavy duty trucks	NO_x	*1996 and after*	*4.0 gbh.*
	PM	*1991–93*	*0.25 gbh.*
	PM	*1994 and after*	*0.1 gbh.*
Heavy duty buses	*PM*	*1991 and after*	*0.1 gbh.*

[1] *Standards are expressed in grams per mile (gpm) or grams per brake horsepower hour (gbh).*

(2) Effective with respect to model years after 1992, any motor vehicle with a loaded vehicle weight of three thousand seven hundred and fifty pounds or less, as determined by the Administrator, shall be a light duty vehicle.

(h) Cold CO Standard.—The Administrator shall promulgate regulations under subsection (a) applicable to emissions of carbon monoxide from light duty vehicles and light duty trucks when operated at twenty degrees Fahrenheit. Such regulations shall contain standards which provide that, with respect to model years 1993 through 1999, emissions of carbon monoxide in the case of light duty vehicles may not exceed ten grams per mile and, in the case of light duty trucks, thirteen grams per mile. Such regulation shall also contain standards that provide that with respect to model year 2000 and thereafter, emissions of carbon monoxide in the case of light duty vehicles may not exceed three and four-tenths grams per mile, and, in the case of light duty trucks, four and four-tenths grams per mile.

(i) Evaporative Emissions.—Within eighteen months after the enactment of this subsection the Administrator shall promulgate regulations under subsection (a) applicable to evaporative emissions

of hydrocarbons, including emissions during vehicle operation, from all gasoline-fueled motor vehicles. Such regulations shall take effect beginning in model year 1994 and shall require the greatest degree of emission reduction achievable by means expected to be available during any model year to which such regulations apply.

(j) ONBOARD EMISSION DIAGNOSTIC SYSTEMS—

(1) Within eighteen months after enactment of this subsection, the Administrator shall promulgate regulations under subsection (a) requiring manufacturers to install on all new light duty vehicles and light duty trucks diagnostic systems capable of—

(A) accurately identifying emission-related systems deterioration or malfunction including, at a minimum, the catalytic converter and oxygen sensor, which could cause or result in failure of the vehicles to comply with emission standards established under this section,

(B) alerting the vehicle's owner or operator to the likely need for emission-related components or systems maintenance or repair, and

(C) providing access to stored information in a manner specified by the Administrator.

The Administrator may, in the Administrator's discretion, promulgate regulations requiring manufacturers to install such onboard diagnostic systems on heavy-duty vehicles and engines.

(2) The regulations required under paragraph (1) with respect to light duty vehicles and light duty trucks shall take effect no later than model year 1994.

(3) The Administrator may by regulation require States that have implementation plans containing motor vehicle inspection and maintenance programs to amend their plans within two years of promulgation of such regulations to provide for inspection of onboard diagnostic systems (as prescribed by regulations under paragraph (1) of this subsection) and the maintenance or repair of malfunctions or system deterioration identified by or affecting such diagnostic system.

(k) LOW-POLLUTING VEHICLES.—

(1) Within eighteen months after the enactment of this subsection, the Administrator shall promulgate specific standards under subsection (a) for motor vehicles which burn low-polluting fuel. Such standards shall apply to the emission of carbon monoxide, formaldehyde, hydrocarbons, oxides of nitrogen, carbon dioxide, and such other air pollutants as the Administrator may identify as a potential threat to public health or welfare. The Administrator may establish different standards for vehicles powered by each of such fuels. Such standards shall take effect in the second model year commencing after the model year in which the standards are promulgated.

(2) Any standard referred to in paragraph (1) shall require that each vehicle which burns a low-polluting fuel use the best available technology for the control of each air pollutant referred to in paragraph (1), taking costs into account. Such standard shall not permit emissions of any such air pollutant, including evaporative emissions, to exceed the standard applicable to emissions of such air pollutant from comparable gasoline

powered vehicles under subsection (a) and shall require that such emissions contribute less to ozone formation.

(3) Nothing in this subsection shall be construed to prevent the Administrator from certifying (under section 206) any motor vehicle having a multiple fuel capability or capable of burning a mixture of fuels if the vehicle meets the standards under this subsection for each such fuel which it is capable of burning.

(l) Averaging Prohibited.—Each emission standard under this section shall apply to, and be met by, each and every vehicle or engine sold, offered for sale, introduced into commerce, or imported, and may not be met or complied with by the average of the performance of various vehicles, engines, engine families, or models manufactured by the same manufacturer.

PROHIBITED ACTS

Sec. 203. (a) The following acts and the causing thereof are prohibited—

(1) in the case of a manufacturer of new motor vehicles or new motor vehicle engines for distribution in commerce, the sale, or the offering for sale, or the introduction, or delivery for introduction, into commerce, or (in the case of any person, except as provided by regulation of the Administrator), the importation into the United States, of any new motor vehicle or new motor vehicle engine, manufactured after the effective date of regulations under this part which are applicable to such vehicle or engine unless such vehicle or engine is covered by a certificate of conformity issued (and in effect) under regulations prescribed under this part (except as provided in subsection (b));

(2) for any person to fail or refuse to permit access to or copying of records or to fail to make reports or provide information, required under section 208 or for any person to fail or refuse to permit entry, testing, or inspection authorized under section 206(c), *or to refuse to pay for procurement or testing under section 207(c)*;

[(3)(A) for any person to remove or render inoperative any device or element of design installed on or in a motor vehicle or motor vehicle engine in compliance with regulations under this title prior to its sale and delivery to the ultimate purchase, or for any manufacturer or dealer knowingly to remove or render inoperative any such device or element of design after such sale and delivery to the ultimate purchaser; or

[(B) for any person engaged in the business of repairing, servicing, selling, leasing, or trading motor vehicles or motor vehicle engines, or who operates a fleet of motor vehicles, knowingly to remove or render inoperative any device or element of design installed on or in a motor vehicle or motor vehicle engine in compliance with regulations under this title following its sale and delivery to the ultimate purchaser; or]

(3)(A) for any person to remove or render inoperative any device or element of design installed on or in a motor vehicle or motor vehicle engine in compliance with regulations under this title prior to its sale and delivery to the ultiamte purchaser, or

for any person knowingly to remove or render inoperative any such device or element of design after such sale and delivery to the ultimate purchaser; or

(B) for any person to manufacture or sell, or offer to sell, any part or component intended for use with, or as part of, any motor vehicle or motor vehicle engine, where a principal effect of such part or component is to bypass, defeat, or render inoperative any device or element of design installed on or in a motor vehicle or motor vehicle engine in compliance with regulations under this title, and where such person knows or should know that such part or component is being offered for sale for such use or put to such use; or

(4) for any manufacturer of a new motor vehicle or new motor vehicle engine subject to standards prescribed under section 202—

(A) to sell or lease any such vehicle or engine unless such manufacturer has complied with the requirements of section 207 (a) and (b) with respect to such vehicle or engine, and unless a label or tag is affixed to such vehicle or engine in accordance with section 207(c)(3),

(B) to fail or refuse to comply with the requirements of section 207 (c) or (e),

(C) except as provided in subsection (c)(3) of section 207, to provide directly or indirectly in any communication to the ultimate purchaser or any subsequent purchaser that the coverage of any warranty under this Act is conditioned upon use of any part, component, or system manufactured by such manufacturer or any person acting for such manufacturer or under his control, or conditioned upon service performed by any such person, or

(D) to fail or refuse to comply with the terms and conditions of the warranty under section 207 (a) or (b) with respect to any vehicle.

No action with respect to any element of design referred to in paragraph (3) (including any adjustment or alteration of such element) shall be treated as a prohibited Act under such paragraph (3) if such action is in accordance with section 215. Nothing in paragraph (3) shall be construed to require the use of manufacturer parts in maintaining or repairing any motor vehicle or motor vehicle engine. For the purposes of the preceding sentence, the term "manufacturer parts" means, with respect to a motor vehicle engine, parts produced or sold by the manufacturer of the motor vehicle or vehicle engine. *No action with respect to any device or element of design referred to in paragraph (3)(A) shall be treated as a prohibited act under that paragraph until the vehicle or engine on which such device or element of design had been installed (i) has been subsequently released from the custody and control of the person peforming such action, if such person is a manufacturer, dealer, or person engaged in the business of repairing, servicing, selling, leasing or trading motor vehicles or motor vehicle engines (or an employee or agent of such a person), or (ii) has been subsequently operated on a street or highway, if the person performing such* *action is a person who operates a fleet of motor vehicles or any person other than a person listed in (i).*

*　　*　　*　　*　　*　　*　　*

PENALTIES

[Sec. 205. Any person who violates paragraph (1), (2), or (4) of section 203(a) or any manufacturer, dealer, or other person who violates paragraph (3)(A) of section 203(a) shall be subject to a civil penalty of not more than $10,000. Any person who violates paragraph (3)(B) of such section 203(a) shall be subject to a civil penalty of not more than $2,500. Any such violation with respect to paragraph (1), (3), or (4) of section 203(a) shall constitute a separate offense with respect to each motor vehicle or motor vehicle engine.]

Sec. 205. (a) Civil Penalties.—Any person who violates paragraph (1), (2), or (4) of section 203(a) or any manufacturer or dealer who violates paragraph (3)(A) of section 203(a) of this title shall be subject to a civil penalty of not more than $25,000. Any other person who violates paragraph (3)(A) or any person who violates paragraph (3)(B) of such section 203(a) shall be subject to a civil penalty of not more than $2,500. Any such violation with respect to paragraph (1), (3)(A), or (4) of section 203(a) of this title shall constitute a separate offense with respect to each motor vehicle or motor vehicle engine. Any such violation with respect to paragraph (3)(B) of such section shall constitute a separate offense with respect to each part or component. Any such violation with respect to paragraph (2) of such section shall constitute a separate offense with respect to each day of violation.

(b) Civil Actions.—The Administrator may commence a civil action to assess and recover any civil penalty prescribed in subsection (a) of this section, subsection (d) of section 211 (pertaining to fuels and fuel additives), subsection (b) of section 216 (pertaining to emissions of carbon dioxide), or subsection (c) of section 217 (pertaining to nonroad engines and vehicles). Any action under this subsection may be brought in the district court of the United States for the district in which the violation is alleged to have occurred or in which the defendant resides or has his principal place of business, and such court shall have jurisdiction to assess such civil penalty. In determining the amount of any civil penalty to be assessed under this subsection, the court shall consider the seriousness of the violation, the economic benefit or savings (if any) resulting from the violation, the size of the violator's business, the violator's history of compliance with this title, any good faith efforts to comply with the applicable requirements, the econoic impact of the penalty on the violator, and such other matters as justice may require. In any such action, subpoenas for witnesses who are required to attend a district court in any district may run into any other district.

(c)(1) The Administrator may assess a civil penalty prescribed in subsection (a) of this section, subsection (d) of section 211 (pertaining to fuels or fuel additives), subsection (b) of section 216 (pertaining to emissions of carbon dioxide) or subsection (c) of section 217 (pertaining to nonroad engines or vehicles), except that the maximum amount of any civil penalty assessed under this paragraph shall not exceed $200,000. Assessment of a civil penalty under this subsection

shall be by an order made on the record after opportunity for a hearing in accordance with section 554 of title 5, United States Code. The Administrator may issue rules for discovery procedures for hearings under this paragraph.

(2) In determining the amount of any civil penalty assessed under this subsection, the Administrator shall consider the seriousness of the violation, the economic benefit (if 5any) resulting from the violation, the size of the violator's business, the violator's history of compliance with this title, any good-faith efforts to comply with the applicable requirements, the economic impact on the violator, and such other matters as justice may require.

(3)(A) Action by the Administrator under this subsection shall not affect or limit the Administrator's authority to enforce any provision of this Act, except that any violation—(i) with respect to which the Administrator has commenced and is diligently prosecuting an action under this subsection, or (ii) for which the Administrator has issued a final order not subject to further judicial review and the violator has paid a penalty assessment under this subsection, shall not be the subject of civil penalty action under subsection (b).

(B) No action by the Administrator under this subsection shall affect any person's obligation to comply with any section of this Act.

(4) An order issued under this subsection shall become final thirty days after its issuance unless a petition for judicial review is filed under paragraph (5).

(5) Any person against whom a civil penalty is assessed in accordance with this subsection may obtain review of such assessment in the United States Court of Appeals for the District of Columbia Circuit, or for any other circuit in which such person resides or transacts business, by filing a notice of appeal in such court within the thirty-day period beginning on the date the civil penalty order is issued and by simultaneously sending a copy of such notice to the Administrator and the Attorney General. The Administrator shall promptly file in such court a certified copy of the record on which the order was issued. Such court shall not set aside or remand such order unless there is not substantial evidence in the record, taken as a whole, to support the finding of a violation or unless the Administrator's assessment of the penalty constitutes an abuse of discretion, and such court shall not impose additional civil penalties for the same violation unless the Administrator's assessment of the penalty constitutes an abuse of discretion.

(6) If any person fails to pay an assessment of a civil penalty imposed by the Administrator as provided in this subsection—

> *(A) after the order making the assessment has become final, or*
>
> *(B) after a court in an action brought under paragraph (5) has entered a final judgment in favor of the Administrator,*

the Administrator shall request the Attorney General to bring a civil action in an appropriate district court to recover the amount assessed (plus interest at rates established pursuant to 26 U.S.C. 6621(a)(2) from the date of the final order or the date of the final judgment, as the case may be). In such an action, the validity, amount, and appropriateness of such penalty shall not be subject to review. Any person who fails to pay on a timely basis the amount of an assessment of a civil penalty as described in the first sentence of *this paragraph shall be required to pay, in addition to such amount and interest, attorneys fees and costs for collection proceedings, and a quarterly nonpayment penalty for each quarter during which such failure to pay persists. Such nonpayment penalty shall be in an amount equal to 20 per centum of the aggregate amount of such person's penalties and nonpayment penalties which are unpaid as of the beginning of such quarter.*

(7) The Administrator may issue subpoenas for the attendance and testimony of witnesses and for the production of relevant papers, books, or documents in connection with hearings under this subsection. In case of contumacy or refusal to obey a subpoena issued under this paragraph and served upon any person, the district court of the United States for any district in which such person is found, resides, or transacts business, upon application by the United States and after notice to such person, shall have jurisdiction to issue an order requiring such person to appear and give testimony before the Administrator, or to appear and produce documents before the Administrator, or both. Any failure to obey such order of the court may be punished by such court as a contempt thereof.

MOTOR VEHICLE AND MOTOR VEHICLE ENGINE COMPLIANCE TESTING AND CERTIFICATION

SEC. 206. (a)(1) * * *

* * * * * * *

(4) Not later than one year after the enactment of this paragraph, the Administrator shall promulgate regulations adding an idle test and idle test mode to the Federal test procedure for light duty vehicles. Such modified test procedure shall be used for the certification of light duty vehicles and engines manufactured during or after model year 1992.

(b)(1) * * *

* * * * * * *

(3) The Administrator shall revise the regulations under this section regarding selective enforcement auditing of new light duty vehicles (as set forth in section 86.610 of subpart G of part 86 of title 40 of the Code of Federal Regulations) such that the maximum percentage of failing vehicles that, for purposes of sampling inspection, can be considered satisfactory as a process average for purposes of such selective enforcement audits shall be 10 per centum. Such revised regulations shall apply with respect to motor vehicles manufactured after the model year 1991.

* * * * * * *

(h) Within eighteen months after the enactment of this subsection and at least every four years thereafter, the Administrator shall review and revise as necessary the regulations under subsection (a) and (b) of this section regarding the testing of motor vehicles and motor vehicle engines to insure that vehicles are tested under circumstances which reflect the actual current driving conditions under which motor vehicles are used, including conditions relating to fuel, temperature, acceleration and altitude. Such revised test procedures shall include testing of evaporative emissions (including running losses) as well as tail-pipe emissions and shall provide for

the testing of trucks with a gross vehicle weight rating of six thousand pounds or more in a loaded mode approximating such rating.

COMPLIANCE BY VEHICLES AND ENGINES IN ACTUAL USE

SEC. 207. (a)(1) Effective with respect to vehicles and engines manufactured in model years beginning more than 60 days after the date of the enactment of the Clean Air Amendments of 1970, the manufacturer of each new motor vehicle and new motor vehicle engine shall warrant to the ultimate purchaser and each subsequent purchaser that such vehicle or engine is (A) designed, built, and equipped so as to conform at the time of sale with applicable regulations under section 202, and (B) free from defects in materials and workmanship which cause such vehicle or engine to fail to conform with applicable regulations for its useful life (as determined under sec. 202(d)). *In the case of vehicles and engines manufactured in the model year 1995 and thereafter such warranty shall require that the vehicle or engine is free from any such defects for the period of two years or twenty-four thousand miles of use (whichever first occurs), except that for a specified major emission control component (as defined in subsection (i)) such warranty shall require that such component is free from any such defects for the period of eight years or eighty thousand miles of use (whichever first occurs).*

* * * * * * *

(b) If the Administrator determines that (i) there are available testing methods and procedures to ascertain whether, when in actual use throughout its [useful life (as determined under section 202(d)),] *warranty period (as determined under subsection (i)),* each vehicle and engine to which regulations under section 202 apply complies with the emission standards of such regulations, (ii) such methods and procedures are in accordance with good engineering practices, and (iii) such methods and procedures are reasonably capable of being correlated with tests conducted under section 206(a)(1), then—

(1) he shall establish such methods and procedures by regulation, and

(2) at such time as he determines that inspection facilities or equipment are available for purposes of carrying out testing methods and procedures established under paragraph (1), he shall prescribe regulations which shall require manufacturers to warrant the emission control device or system of each new motor vehicle or new motor vehicle engine to which a regulation under section 202 applies and which is manufactured in a model year beginning after the Administrator first prescribes warranty regulations under this paragraph. The warranty under such regulations shall run to the ultimate purchaser and each subsequent purchaser and shall provide that if—

(A) the vehicle or engine is maintained and operated in accordance with instructions under subsection (c)(3),

(B) it fails to conform at anytime during its [useful life (as determined under section 202(d))] *warranty period (as determined under subsection (i)),* to the regulations precribed under section 202, and

(C) such nonconformity results in the ultimate purchaser (or any subsequent purchaser) of such vehicle or engine having to bear any penalty or other sanction (including the denial of the right of use vehicle or engine) under State or Federal law,

then such manufacturer shall remedy such nonconformity under such warranty with the cost thereof to be borne by the manufacturer. No such warranty shall be invalid on the basis of any part used in the maintenance or repair of a vehicle or engine if such part was certified as provided under subsection (a)(2). [For purposes of the warranty under this subsection, for the period after twenty-four months or twenty-four thousand miles (whichever first occurs) the term "emission control devices or system" means a catalytic converter, thermal reactor, or other component installed on or in a vehicle for the sole or primary purpose of reducing vehicle emissions. Such terms shall not include those vehicle components which were in general use prior to model year 1968.]

(c) * * *

(1) * * *

* * * * * * *

(4) In making determinations of nonconformity under this subsection, the Administrator shall take into account information collected under any State vehicle emission control inspection and maintenance program. Any State in which such a program is operating may petition the Administrator to make a determination of nonconformity under paragraph (1) on the basis of information collected in such program. The Administrator shall act upon such petition within sixty days of receipt of such petition.

(5) If the Administrator has reason to believe that in-use vehicles or engines may not conform to regulations prescribed under section 202, the Administrator may require the manufacturer of such vehicles or engines to pay the costs that the Adminstrator incurs in procuring and testing such vehicles or engines. Such reason to believe shall be based on data or information avaialble to the Administrator, including but not limited to, field surveys, State inspection and maintenance programs and consumer compliants.

* * * * * * *

(i) WARRANTY PERIOD.—

(1) For purposes of subsection (a)(1) and subsection (b), the warranty period, in the case of light duty vehicles and light duty vehicle engines manufactured during or before the 1994 model year shall be the useful life (as determined under section 202(d)). For the purposes of such subsections, the warranty period, in the case of such vehicles and engines manufactured during model year 1995 and thereafter, shall be the first two years or twenty-four thousand miles of use (whichever first occurs), except as provided in paragraph (2).

(2) In the case of a specified major emission control component, the warranty period for purposes of subsection (a)(1) and

subsection (b) shall be eight years or eighty thousand miles of use (whichever first occurs). As used in this paragraph, the term 'specified major emission control component' means only a catalytic converter or electronic emissions control unit, except that the Administrator may designate any other pollution control device or component as a specified major emission control component if—

(A) the device or component (except in the case of onboard emission control diagnostic equipment required by section 216) was not in general use on vehicles and engines manufactured prior to the model year 1990; and

(B) the Administrator determines that the retail cost (exclusive of instalation costs) of such device or component exceeds $200 (in 1989 dollars, adjusted for inflation or deflation as calculated by the Administrator at the time of such determination).

Nothing in this Act shall be interpreted to mean that parts other than those specified by the Administrator as major emission control components shall be construed to be warranted under this Act for eight years or eighty thousands miles.

(3) Subparagraph (A) of subsection (b)(2) shall apply only where the Administrator has made a determination that the instructions concerned conform to the requirements of subsection (c)(3).

* * * * * * *

REGULATION OF FUELS

SEC. 211. (a) * * *

* * * * * * *

[(d) Any person who violates subsection (a) or (f) or the regulations prescribed under subsection (c) or who fails to furnish any information required by the Administrator under subsection (b) shall forfeit and pay to the United States a civil penalty of $10,000 for each and every day of the continuance of such violation, which shall accrue to the United States and be recovered in a civil suit in the name of the United States, brought in the district where such person has his principal office or in any district in which he does business. The Administrator may, upon application therefor, remit or mitigate any forfeiture provided for in this subsection and he shall have authority to determine the facts upon all such applications.]

(d)(1) Any person who violates subsection (a), (f), (g), (j), or (l) or the regulations prescribed under subsection (c), (h), (i), or (k) or who fails to furnish any information or conduct any tests required by the Administrator under subsection (b) shall be liable to the United States for a civil penalty of not more than $25,000 per day of violation. Any violation with respect to a regulation prescribed under subsection (c) of this section which establishes a regulatory standard based upon a military averaging period shall constitute a separate day of violation for each and every day in the averaging period. Such civil penalties shall be assessed in accordance with the provisions of subsections (b) and (c) of section 205.

(2) INJUNCTIVE AUTHORITY.—The district courts of the United States shall have jurisdiction to restrain violations of subsections (a), (f), (g), or (j) and of the regulations prescribed under subsection (c), (h), (i), or (k), to award other appropriate relief, and to compel the furnishing of information and the conduct of tests required by the Administrator under subsection (b). Actions to restrain such violations and compel such actions shall be brought by and in the name of the United States.

[(g)(1) For the purposes of this subsection:

[(A) The terms "gasoline" and "refinery" have the meaning provided under regulations of the Administrator promulgated under this section.

[(B) The term "small refinery" means a refinery or a portion of refinery producing gasoline—

[(i) the gasoline producing capacity of which was in operation or under construction at any time during the one-year period immediately preceding October 1, 1976, and

[(ii) which has a crude oil or bona fide feed stock capacity (as determined by the Administrator) of 50,000 barrels per day or less and

[(iii) which is owned or controlled by a refiner with a total combined crude oil or bona fide feed stock capacity (as determined by the Administrator) of 137,500 barrels per day or less.

[(2) No regulations of the Administrator under this section (or any amendment or revision thereof) respecting the control or prohibition of lead additives in gasoline shall require a small refinery prior to October 1, 1982, to reduce the average lead content per gallon of gasoline refined at such refinery below the applicable amount specified in the table below:

[If the average gasoline production of the small refinery for the immediately preceding calendar year (or, in the case or refineries under construction half the designed crude oil capacity) was (in barrels per day):

	The applicable amount (in grams per gallon)
5,000 or under	2.65.
5,001 to 10,000	2.15.
10.001 to 15,000	1.65.
15,001 to 20,000	1.30.
20,001 to 25,000	.80
25,001 to over	As prescribed by the Administrator, but not greater than 0.80.

The Administrator may promulgate such regulations as he deems appropriate with respect to the reduction of the average lead content of gasoline refined by small refineries on and after October 1, 1982, taking into account the experience under the preceding provisions of this paragraph.

[(3) Effective on the date of the enactment of this subsection, the regulations of the Administrator under this section respecting fuel additives (40 CFR part 80) shall be deemed amended to comply with the requirement contained in paragraph (2).

[(4) Nothing in this section shall be construed to preempt the right of any State to take action as permitted by section 211(c)(4) of this Act.]

(g)(1) No person shall introduce, or cause or allow the introduction of, leaded gasoline into any motor vehicle which is labeled "unleaded gasoline only," which is equipped with a gasoline tank filler inlet designed for the introduction of unleaded gasoline, which is a 1990 or later model year motor vehicle, or which such person knows or should know is a vehicle designed solely for the use of unleaded gasoline.

(2) Beginning October 1, 1993, no person shall introduce or cause or allow the introduction into any motor vehicle of diesel fuel which such person knows or should know contains a concentration of sulfur in excess of 0.05 per centum (by weight) or which fails to meet a cetane index minimum of 40.

(h) EVAPORATIVE EMMISSION FROM MOTOR VEHICLE FUELS.—

(1) The Administrator shall promulgate regulations to reduce evaporative emissions from motor vehicle fuels.

(2) Regulations under this subsection shall include a standard for gasoline volatility. The standard shall apply to all gasoline sold, or offered for sale, or introduced into commerce for use in motor vehicles during the high ozone periods of each year. Effective with respect to gasoline sold in the second high ozone period which commences after the enactment of this subsection, the standard shall require that such gasoline sold, or offered for sale, or introduced into commerce for use in motor vehicles in class C areas (as defined by the American Society of Testing Materials as of the date of enactment of this subsection) shall not exceed a Reid vapor pressure of nine pounds per square inch unless the Admistrator establishes a lower number which the administrator determines to be achievable and appropriate for purposes of protecting public health and welfare. The regulations shall require a proportional reduction in areas other than such class C areas.

(3) For purposes of regulations referred to in paragraph (2), the high ozone period shall be the period between May 16 and September 15 each year or such longer period as the Administrator established for any region to cover periods of potential ozone air pollution in excesss of the standard for ozone for the region.

(4) For fuel blends containing gasoline and 10 per centum denatured anhydrous ethanol, the Reid vapor pressure elimination pursuant to this subsection shall be one pound per square inch greater than the applicable Reid vapor pressure limitations established under paragraph (2): Provided, however, That a refiner, distributor, blender, marketer, reseller, carrier, retailer, or wholesale purchaser shall be deemed to be in full compliance with the provisions of this subsection and the regulations promulgated thereunder, if it can demonstrate (by showing receipt of a certification or other evidence acceptable to the Ad-

ministrator) that (A) the gasoline portion of the blend complies with the Reid vapor pressure limitations promulgated pursuant to this subsection, and (B) the ethanol portion of the blend does not exceed its waiver condition under subsection (f)(4).

(i) DESULFURIZATION OF DIESEL FUEL.—

(1) Effective October 1, 1993, no person shall manufacture, sell, offer for sale, dispense, transport or introduce into commerce motor vehicle diesel fuel which contains a concentration of sulfur in excess of 0.05 per centum (by weight) or which fails to meet a cetane index minimum of 40.

(2) No later than twelve months after the enactment of this subsection, the Administrator shall promulgate regulations to implement and enforce the requirements of paragraph (1). The Administrator shall require manufacturers and importers of diesel fuel not intended for use in motor vehicles to dye such fuel in order to segregate it from motor vehicle diesel fuel.

(3) The sulfur content of fuel required to be used in the certification of 1991 through 1993 model year heavy-duty diesel vehicles and engines shall not exceed 0.05 per centum (by weight). The sulfur content and cetane index minimum of fuel required to be used in certification of 1994 and later model year heavy-duty diesel vehicles and engines shall comply with the regulations promulgated under paragraph (2).

(j) PROHIBITION ON LEADED GASOLINE FOR HIGHWAY USE.—Effective January 1, 1991, it shall be unlawful for any person to sell, offer for sale, or introduce into commerce, for use as fuel in any motor vehicle (as defined in section 219(2)) any gasoline which contains lead or lead additives. The Administrator may extend the January 1, 1991, deadline for up to two years, if the Administrator determines that unavailability of gasoline containing lead or lead additives for such vehicles will reduce the availability of such gasoline for farm vehicles and that alternatives to gasoline containing lead or lead additives are unavailable for use in gasoline powered farm vehicles.

(k) FUEL QUALITY.—

(1) Not later than thirty-six months after the date of enactment of this subsection the Administrator shall, after notice and opportunity for public comment, promulgate regulations establishing specifications for fuel quality which will minimize, to the extent economically and technically achievable, emissions (including evaporative emissions) of hydrocarbons, carbon monoxide, oxides of nitrogen, particulate matter and hazardous air pollutants over the useful life of vehicles and engines certified for manufacture under this title. Such regulations may prohibit the presence of fuel impurities and other substances or mandate the use of specific additives to achieve the purposes of this subsection. The regulations shall be effective for fuels sold on and after January 1, 1994. In the event that the Administrator does not promulgate the regulations required by this paragraph, effective January 1, 1994, it shall be unlawful to sell, offer for sale or introduce into commerce any fuel for use in a gasoline-powered vehicle unless such fuel contains additives effective in preventing the accumulation of deposits in fuel-injected engines.

(2) In order to achieve and maintain attainment of ambient air quality standards, the Administrator may promulgate regulations applicable to fuel refiners, distributors, marketers, or consumers establishing specifications for fuels (including regulations requiring the availability or sale of fuels meeting the specifications in a nonattainment area or areas) to reduce emissions of pollutants subject to a standard under this title or hazardous air pollutants from motor vehicles. In establishing such specifications and availability requirements the Administrator shall consider other environmental effects which would result from production and use of fuels meeting the specifications. The Administrator shall require as part of any specification under this paragraph that there be no increase in emissions of any other pollutant subject to a standard under this title or any hazardous air pollutant by vehicles using the specified fuel. Regulations under this paragraph shall be stated as performance standards and may be satisfied by any fuel which, as certified to the Administrator by the refiner or distributor, achieves comparable emissions reductions and otherwise satisfies the specification.

(l)(1) Except as provided in paragraph (2) and effective October 1, 1991, no person shall, during the period from October 1 to March 31 each year, sell, offer for sale, or introduce into commerce in any area classified as nonattainment for carbon monoxide any gasoline fuel for use in a motor vehicle unless the oxygen content of such fuel shall be 3.1 per centum or greater.

(2) The Administrator shall, not later than nine months after the date of enactment of this subsection, promulgate guidelines allowing the exchange of marketable oxygen credits between sellers of fuels with an oxygen content higher than that required by paragraph (1) and other sellers of fuels to offset the sale or use of fuels with a lower content than required: Provided, That such exchanges shall not be permitted between sellers located in different nonattainment areas and that the average oxygen content of fuels sold in any area that is nonattainment for carbon monoxide be 3.1 per centum or greater.

(3) The Administrator may waive, in whole or in part, the requirements of this subsection in any area upon a demonstration by the State to the satisfaction of the Administrator that the use of oxygenated fuels would prevent or interfere with the attainment by such area of a national primary ambient air quality standard (or a State or local ambient air quality standard) for any air pollutant other than carbon monoxide.

(4) Any person selling oxygenated fuel at retail pursuant to this subsection shall be required under regulations promulgated by the Administrator to label the fuel dispensing system with a notice that the fuel is oxygenated and will reduce carbon monoxide emissions from motor vehicles.

[DEVELOPMENT OF LOW-EMISSION VEHICLES

[SEC. 212. (a) For the purpose of this section—

[(1) The term "Board" means the Low-Emission Vehicle Certification Board.

[(2) The term "Federal Government" includes the legislative, executive, and judicial branches of the Government of the United States, and the government of the District of Columbia.

[(3) The term "motor vehicle" means any selfpropelled vehicle designed for use in the United States on the highways, other than a vehicle designed or used for military field training, combat, or tactical purposes.

[(4) The term "low-emission vehicle" means any motor vehicle which—

[(A) emits any air pollutant in amounts significantly below new motor vehicle standards applicable under section 202 at the time of procurement to that type of vehicle; and

[(B) with respect to all other air pollutants meets the new motor vehicle standards applicable under section 202 at the time of procurement to that type of vehicle.

[(5) The term "retail price" means (A) the maximum statutory price applicable to any class or model of motor vehicle; or (B) in any case where there is no applicable maximum statutory price, the most recent procurement price paid for any class or model of motor vehicle.

[(b)(1) There is established a Low-Emission Vehicle Certification Board to be composed of the Administrator or his designee, the Secretary of Transportation or his designee, the Chairman of the Council on Environmental Quality or his designee, the Director of the National Highway Safety Bureau in the Department of Transportation, the Administrator of General Services, and two members appointed by the President. The President shall designate one member of the Board as Chairman.

[(2) Any member of the board not employed by the United States may receive compensation at the rate of $125 for each day such member is engaged upon work of the Board. Each member of the Board shall be reimbursed for travel expenses, including per diem in lieu of subsistence as authorized by section 5703 of title 5, United States Code, for persons in the Government service employed intermittently.

[(3)(A) The Chairman, with the concurrence of the members of the Board, may employ and fix the compensation of such additional personnel as may be necessary to carry out the functions of the Board, but no individual so appointed shall receive compensation in excess of the rate authorized for GS-18 by section 5332 of title 5, United States Code.

[(B) The Chairman may fix the time and place of such meetings as may be required, but a meeting of the Board shall be called whenever a majority of its members so requests.

[(C) The Board is granted all other powers necessary for meeting its responsibilities under this section.

[(c) The Administrator shall determine which models or classes of motor vehicles qualify as low-emission vehicles in accordance with the provisions of this section.

[(d)(1) The Board shall certify any class or model of motor vehicles—

[(A) for which a certification application has been filed in accordance with paragraph (3) of this subsection;

[(B) which is a low-emission vehicle as determined by the Administrator; and

[(C) which it determines is suitable for use as a substitute for a class or model of vehicles at that time in use by agencies of the Federal Government

The Board shall specify with particularity the class or model of vehicles for which the class or model of vehicles described in the application is a suitable substitute. In making the determination under this subsection the Board shall consider the following criteria:

[(i) the safety of the vehicle;
[(ii) its performance characteristics;
[(iii) its reliability potential;
[(iv) its serviceability;
[(v) its fuel availability;
[(vi) its noise level; and
[(vii) its maintenance costs as compared with the class or model of motor vehicle for which it may be a suitable substitute.

[(2) Certification under this section shall be effective for a period of one year from the date of issuance.

[(3)(A) Any party seeking to have a class or model of vehicle certified under this section shall file a certification application in accordance with regulations prescribed by the Board.

[(B) The Board shall publish a notice of each application received in the Federal Register.

[(C) The Administrator and the Board shall make determinations for the purpose of this section in accordance with procedures prescribed by regulation by the Administrator and the Board, respectively.

[(D) The Administrator and the Board shall conduct whatever investigation is necessary, including actual inspection of the vehicle at a place designated in regulations prescribed under subparagraph (A).

[(E) The Board shall receive and evaluate written comments and documents from interested parties in support of, or in opposition to, certification of the class or model of vehicle under consideration.

[(F) Within ninety days after the receipt of a properly filed certification application, the Administrator shall determine whether such class or model of vehicle is a low-emission vehicle, and within 180 days of such determination, the Board shall reach a decision by majority vote as to whether such class or model of vehicle, having been determined to be a low-emission vehicle, is a suitable substitute for any class or classes of vehicles presently being purchased by the Federal Government for use by its agencies.

[(G) Immediately upon making any determination or decision under subparagraph (F), the Administrator and the Board shall each publish in the Federal Register notice of such determination or decision, including reasons therefor and in the case of the Board any dissenting views.

[(e)(1) Certified low-emission vehicles shall be acquired by purchase or lease by the Federal Government for use by the Federal Government in lieu of other vehicles if the Administrator of General Services determines that such certified vehicles have procurement costs which are no more than 150 per centum of the retail price of the least expensive class or model of motor vehicle for which they are certified substitutes.

[(2) In order to encourage development of inherently low-polluting propulsion technology, the Board may, at its discretion, raise the premium set forth in paragraph (1) of this subsection to 200 per centum of the retail price of any class or model of motor vehicle for which a certified low-emission vehicle is a certified substitute, if the Board determines that the certified low-emission vehicle is powered by an inherently low-polluting propulsion system.

[(3) Data relied upon by the Board and the Administrator in determining that a vehicle is a certified low-emission vehicle shall be incorporated in any contract for the procurement of such vehicle.

[(f) The procuring agency shall be required to purchase available certified low-emission vehicles which are eligible for purchase to the extent they are available before purchasing any other vehicles for which any low-emission vehicle is a certified substitute. In making purchasing selections between competing eligible certified low-emission vehicles, the procuring agency shall give priority to (1) any class or model which does not require extensive periodic maintenance to retain its low-polluting qualities or which does not require the use of fuels which are more expensive than those of the classes or models of vehicles for which it is a certified substitute; and (2) passenger vehicles other than buses.

[(g) For the purpose of procuring certified low-emission vehicles any statutory price limitations shall be waived.

[(h) The Administrator shall, from time to time as the Board deems appropriate, test the emissions from certified low-emission vehicles purchased by the Federal Government. If at any time he finds that the emission rates exceed the rates on which certification under this section was based, the Administrator shall notify the Board. Thereupon the Board shall give the supplier of such vehicles written notice of this finding, issue public notice of it, and give the supplier an opportunity to make neccessary repairs, adjustment, or replacements. If no such repairs, adjustments, or replacements are made within a period to be set by the Board, the Board may order the supplier to show cause why the vehicle involved should be eligible for recertification.

[(i) There are authorized to be appropriated for paying additional amounts for motor vehicles pursuant to, and for carrying out the provisions of, this section, $5,000,000 for the fiscal year ending June 30, 1971, and $25,000,000 for each of the two succeeding fiscal years.

[(j) The Board shall promulgate the procedures required to implement this section within one hundred and eighty days after the date of enactment of the Clean Air Amendments of 1970.]

URBAN BUSES

SEC. 212. Not later than twelve months after the enactment of the Clean Air Act Amendments of 1989, the Administrator shall promulgate regulations requiring the use of low polluting fuels in new urban buses operated primarily in a metropolitan statistical area or *consolidated metropolitan statistical area (as defined by the United States Office of Management and Budget) with a 1980 population of one million persons or more. The regulations shall provide that all new urban buses beginning with the model year 1994 purchased or placed into service by owners or operators of urban buses in such areas must be capable of operating, and must be exclusively operated, on low polluting fuels. The Administrator shall prescribe a schedule phasing in the applicability of the requirements established by this paragraph over the 1991 through 1994 model years as follows: 10 per centum of new urban buses purchased or placed into service in model year 1991; 25 per centum of new urban buses purchased or placed into service in model year 1992; 60 per centum of new urban buses purchased or placed into service in model year 1993; and 100 per centum of new urban buses purchased or placed into service in 1994 and later model years. Emissions of particulate matter from buses purchased or placed into service as required by this paragraph shall not exceed 0.10 grams per brake horsepower-hour.*

* * * * * * *

EMISSIONS OF CARBON DIOXIDE FROM VEHICLES

Sec. 216. (a) Promulgation of Regulations.—

(1) The Administrator shall promulgate regulations providing for standards applicable to emissions of carbon dioxide from light duty vehicles. Such standards shall require that for each model year 1996 to 1999, the production weighted fleet average of carbon dioxide emissions from light duty vehicles manufactured by any manufacturer shall not exceed two hundred and sixty-six grams per mile, and for model year 2000 and each model year thereafter, such average shall not exceed two hundred and twenty grams per mile.

(2) Test procedures to determine emissions of carbon dioxide shall be those used to determine compliance with corporate average fuel economy requirements for model year 1988, or procedures which the Administrator determines yield comparable results.

(b) Civil Penalties.—

(1) If, based on the number of vehicles manufactured in a given model year, the average of carbon dioxide emissions required to be achieved by a manufacturer under subsection (a) is exceeded, the manufacturer shall be subject to a civil penalty equal to the amount obtained by multiplying $6 by the number of grams per mile by which the average carbon dioxide emissions from the vehicles to which such standard applies exceeds the applicable carbon dioxide standard, multiplied by the number of vehicles to which such standard applies.

(2) The Administrator may promulgate regulations allowing a manufacturer that reduces carbon dioxide emissions below the level required by subsection (a) in one model year to receive credits equal to the number of grams by which the applicable emission standard exceeds the average emissions of vehicles manufactured in such model year, multiplied by the number of vehicles manufactured in such model year. Such credits shall

be available with respect to no more than two model years before or after the model year in which such manufacturer achieves the emission average below the applicable standard.

EMISSION STANDARDS FOR NON-ROAD ENGINES AND VEHICLES

SEC. 217. (a) LIST OF CATEGORIES.—Not later than twenty-four months after the date of enactment of this section and after notice and opportunity for public comment the Administrator shall publish (and from time to time revise) a list of all categories of non-road engines and non-road vehicles together with estimates of the contribution of each category to ambient ozone and carbon monoxide levels in nonattainment areas and to oxides of nitrogen and total particulate levels.

(b) EMISSION STANDARDS.—Whenever the Administrator determines that emissions from categories of non-road engines or vehicles contribute significantly to concentrations of ozone, carbon monoxide or to oxides of nitrogen or particulate levels or otherwise contribute to air pollution that may reasonably be anticipated to endanger public health or welfare, the Administrator shall promulgate regulations applicable to emissions from new vehicles or engines in such categories. Such standards shall achieve the greatest degree of emission reduction achievable through the application of technology which the Administrator determines will be available for the engines or vehicles to which such standards apply, giving appropriate consideration to the cost of applying such technology within the period of time available to manufacturers and to noise, energy, and safety factors associated with the application of such technology. In determining what degree of reduction will be available, the Administrator shall first consider standards equivalent in stringency to standards for comparable motor vehicles or engines (if any) regulated under section 202, taking into account the technological feasibility, costs, safety, noise and energy factors associated with achieving standards of such stringency.

(c) ENFORCEMENT.—The standards under this section shall be subject to the same provisions of title II as are applicable in the case of standards under section 202, and shall be enforced in the same manner as the standards under section 202, with such modifications as the Administrator deems appropriate.

PROHIBITION ON PRODUCTION OF ENGINES REQUIRING LEADED GASOLINE

SEC. 218. The Administrator shall promulgate regulations applicable to motor vehicle engines and non-road engines manufactured after model year 1992 that prohibit the manufacture, sale, or introduction into commerce of any engine that requires leaded gasoline.

DEFINITIONS FOR PART A

[SEC. 216.] *SEC. 219.* As used in this part—

(1) The term "manufacturer" as used in sections 202, 203, 206, 207, and 208 means any person engaged in the manufacturing or assembling of [new motor vehicles or new motor vehicle engines,] *new motor vehicles, new motor vehicle engines, new non-road vehicles or new non-road engines,* or importing

such vehicles or engines for resale, or who acts for and is under the control of any such person in connection with the distribution of [new motor vehicles or new motor vehicle engines,] *new motor vehicles, new motor vehicle engines, new non-road vehicles, or new non-road engines,* but shall not include any dealer with respect to new motor vehicles or new motor vehicle engines received by him in commerce.

* * * * * * *

(7) The term "low polluting fuel" means methanol, ethanol, propane, or natural gas, or any comparably low-polluting fuel. In determining whether a fuel is comparably low-polluting, the Administrator shall consider both the level of emissions of air pollutants from vehicles using the fuel and the contribution of such emissions to ambient levels of air pollutants. For purposes of this subsection, the term "methanol" includes any fuel which contains at least 85 per centum methanol unless the Administrator increases such percentage as he deems appropriate to protect public health and welfare.

(8) The term "non-road engine" means an internal combustion engine (including the fuel system) that is not used in a motor vehicle or in a vehicle used solely for competition in vehicle racing or which is not subject to standards promulgated under section 111 (pertaining to new stationary sources) or section 202 (pertaining to motor vehicles) or to regulation under part B of this title (pertaining to aircraft emissions).

(9) The term "non-road vehicle" means a vehicle that is powered by a non-road engine and that is not a motor vehicle.

(10) the term "urban bus" has the meaning provided under regulations of the Administrator promulgated under section 202(a).

TITLE III—GENERAL

PART A—MISCELLANEOUS

* * * * * * *

SEC. 302. When used in this Act—

* * * * * * *

(g) The term "air pollutant" means any air pollution agent or combination of such agents, including any physical, chemical, biological, radioactive [including source material, special nuclear material, and byproduct material] *excluding source material, special nuclear material, and byproduct material regulated by the Nuclear Regulatory Commission or by a State which has an agreement with the Commission pursuant to section 274 of the Atomic Energy Act of 1954, as amended,* substance or matter which is emitted into or otherwiso enters the ambient air.

(h) All language referring to effects on welfare includes, but is not limited to, effects on soils, water, crops, vegetation, man-made materials, animals, wildlife, weather, visibility, and climate, damage to and deterioration of property, and hazards to transportation, as well as effects on economc values and on personal comfort and well-being, *whether caused by transformation, conversion, or combination with other air pollutants.*

* * * * * * *

(k) The terms "emission limitation" and "emission standard" mean a requirement established by the State or the Administrator which limits the quantity, rate, or concentration of emissions of air pollutants on a continuous basis, including any requirement relating to the operation or maintenance of a source to assure continuous emission reduction, *and any design, equipment, work practice, or operational standard authrized by this Act constitutes a violation of an "emission standard" whether or not an air pollutant is emitted to the ambient air.*

* * * * * * *

(g) STATIONARY SOURCE.—The term "stationary source" means generally any source of an air pollutant except those emissions resulting directly from an internal combustion engine for transportation purposes.

EMERGENCY POWERS

SEC. 303. [a] Notwithstanding any other provisions of this Act, the Administrator upon receipt of evidence that a pollution source or combination of sources (including moving sources) is presenting an imminent and substantial endangerment to [the health of persons, and that appropriate State or local authorities have not acted to abate such sources,] *public health or welfare, or the environment,* may bring suit on behalf of the United States in the appropriate United States district court to immediately restrain any person causing or contributing to the alleged pollution to stop the emission of air pollutants causing or contributing to such pollution or to take such other action as may be necessary. [If it is not practicable to assure prompt protection of the health of persons solely by commencement of such a civil action, the Administrator may issue such orders as may be necessary to protect the health of persons who are, or may be, affected by such pollution source (or sources.)] *If it is not practicable to assure prompt protection of public health or welfare or the environment by commencement of such a civil action, the Administrator may issue such orders as may be necessary to protect public health or welfare or the environment.* [Prior to taking any action under this section, the Administrator shall consult with the State and local authorities in order to confirm the correctness of the information on which the action proposed to be taken is based and to ascertain the action which such authorities are, or will be, taking. Such order shall be effective for a period of not more than twenty-four hours unless the Administrator brings an action under the first sentence of this subsection before the expiration of such period. Whenever the Administrator brings such an action within such period, such order shall be effective for a period of forty-eight hours or such longer period as may be authorized by the court pending litigation or thereafter.

[(b) Any person who willfully violates, or fails or refuses to comply with any order issed by the Administrator under subsection (a) may, in an action brought in the appropriate United States district court to enforce such order, be fined not more than $5,000 for each day during which such violation occurs or failure to comply continues.]

CITIZEN SUITS

SEC. 304. (a) Exept as provided in subsection (b), any person may commence a civil action on his own behalf—

(1) against any person (including (i) the United States, and (ii) any other governmental instrumentality or agency to the extent permitted by the Eleventh Amendment to the Constitution) who is alleged to be in violation of (A) an emission standard or limitation under this Act [or], (B) an order issued by the Administrator or a State with respect to such a standard or limitation, or (C) section 126,

[(2) against the Administrator where there is alleged a failure of the Administrator to perform any act or duty under this Act which is not discretionary with the Administrator, or]

(2) against the Administrator where there is alleged a failure to act that violates one or more of the standards set forth in section 307(d)(9), or constitutes unreasonable delay, provided however that a failure to act does not include a written decision not to take action which the Administrator designates, within such decision, as a final action within the meaning of section 307(b)(1); or

(3) against any person who proposes to construct or constructs any new or modified major emitting facility without a permit required under part C of title I (relating to significant deterioration of air quality) or part D of title I (relating to nonattainment) or who is alleged to be in violation of any condition of such permit.

The district courts shall have jurisdiction, without regard to the amount in controversy or the citizenship of the parties, to enforce such an emission standard or limitation, or such an order, or to order the Administrator to perform such act or duty, *or to compel agency action unreasonably delayed,* as the case may be, *and to apply any appropriate civil penalties (except for actions under paragraph (a)(2)), including those pursuant to a consent judgment, payable to the special fund as established in subsection (g), taking into account the factors listed in section 113(e). Where a provision of the Act mandates that the Administrator shall take specified action when certain preconditions are met, the court's power to compel the specified action under paragraph (2) shall not depend in any manner upon whether the Administrator has published in the Federal Register a proposed or final determination that the threshold preconditions are met.*

(b) No action may be commenced—

(1) under subsection (a)(1)—

(A) prior to 60 days after the plaintiff has given notice of the violation (i) to the Administrator, (ii) to the State in which the violation occurs, and (iii) to any alleged violator of the standard limitation, or order, or

(B) if the Administrator or State has commenced and is diligently prosecuting a civil action in a court of the

United States or a State to require compliance with the standard, limitation, or order, but in any such action in a court of the United States any person may intervene as a matter of right.

(2) under subsection (a)(2) prior to 60 days after the plaintiff has given notice of such action to the Administrator.

except that such action may be brought immediately after such notification in the case of an action under this section respecting a violation of section [112(c)(1)(B)] *112* or an order issued by the Administrator pursuant to section 113(a). Notice under this subsection shall be given in such manner as the Administrator shall prescribe by regulation.

(c)(1) Any action respecting a violation by a stationary source of an emission standard or limitation or an order respecting such standard or limitation may be brought only in the judicial district in which such source is located.

[(2) In such action under this section, the Administrator, if not a party, may intervene as a matter of right.]

(2) In any action under this section, the Administrator, if not a party, may intervene as a matter of right at any time in the proceeding. In such intervention, the Administrator may substitute himself as the plaintiff with regard to any claim for civil penalties. Upon such substitution, the citizen plaintiff's claims for civil penalties shall abate. A judgment in an action under this section to which the United States is not a party shall not, however, have any binding effect upon the United States.

(3) Whenever any action is brought under this section the plaintiff shall serve a copy of the complaint on the Attorney General of the United States and on the Administrator. No consent judgment shall be entered in an action brought under this section in which the United States is not a party prior to forty-five days following the receipt of a copy of the proposed consent judgment by the Attorney General and the Administrator during which time the government may submit its comments on the proposed consent judgment to the court and parties or may intervene as a matter of right.

* * * * * * *

(g) PENALTY FUND.—Penalties received under subsection (a) shall be deposited in a special fund in the United States Treasury for licensing and other services, which shall be available for appropriation, and remain available until expended for use by the Environmental Protection Agency to finance air compliance and enforcement activities.

* * * * * * *

FEDERAL PROCUREMENT

SEC. 306. (a) No Federal agency may enter into any contract with any person who is convicted of any offense under section 113(c)[(1)] for the procurement of goods, materials, and services to perform such contract at any facility at which the violation which gave rise to such conviction occurred if such facility is owned, leased, or supervised by such person. The prohibition in the preceding sentence shall continue until the Administrator certifies that the condition giving rise to such a conviction has been corrected. *For convictions arising under section 113(c)(2), the condition giving rise to the conviction also shall be considered to include any substantive violation of this Act associated with the violation of 113(c)(2). The Administrator may extend this prohibition to other facilities owned or operated by the convicted person.*

* * * * * * *

GENERAL PROVISIONS RELATING TO ADMINISTRATIVE PROCEEDINGS AND JUDICIAL REVIEW

SEC. 307. (a)[(1)] In connection with any determination under section 110(f), [or] section 202(b)(5), or for purposes of obtaining information under section 202(b)(4) or 211(c)(3), *any investigation, monitoring, reporting requirement, entry, compliance inspection, or administrative enforcement proceeding under the Act (including but not limited to section 113, section 114, section 120, section 205, section 206, section 208, section 303 or section 306), or to otherwise carry out the provisions of the Act,* the Administrator may issue subpenas for the attendance and testimony of witnesses and the production of relevant papers, books, and documents, and he may administer oaths. Except for emission data, upon a showing satisfactory to the Administrator by such owner or operator that such papers, books, documents, or information or particular part thereof, if made public, would divulge trade secrets or secret processes of such owner or operator, the Administrator shall consider such record, report, or information or particular portion thereof confidential in accordance with the purposes of section 1905 of title 18 of the United States Code, except that such paper, book, document, or information may be discussed to other officers, employees, or authorized representatives of the United States concerned with carrying out this Act, to persons carrying out the National Academy of Sciences study and investigation provided for in section 202(c), or when relevant in any proceeding under this Act. Witnesses summoned shall be paid the same fees and mileage that are paid witnesses in the courts of the United States. In cases of contumacy or refusal to obey a subpena served upon any person under this subparagraph, the district court of the United States for any district in which such person is found or resides or transacts business, upon application by the United States and after notice to such person, shall have jurisdiction to issue an order requiring such person to appear and give testimony before the Administrator to appear and produce papers, books, and documents before the Administrator, or both, and any failure to obey such order of the court may be punished by such court as a contempt thereof.

(b)(1) A petition for review of action of the Administrator in promulgating any national primary or secondary ambient air quality standard, any emission standard or requirement under section 112, any standard of performance or requirement under section 111, any standard under section 202 (other than a standard required to be prescribed under section 202(b)(1)), any determination under section 202(b)(5), any control or prohibition under section 211, any standard under section 231, any rule issued under section 113, 119, or under section 120, or any other nationally applicable regulations promulgated, or final action taken, by the Administrator under this Act may be filed only in the United States Court of Appeals for the District of Columbia. A petition for review of the Administrator's action in approving or promulgating any implementation plan under section 110 or section 111(d), any order under section 111(j), under section [112(c),] *112,* under section 113(d), under section 119, or under section 120, or his action under section 119(c)(2) (A), (B), or (C) (as in effect before the date of enactment of the Clean Air Act Amendments of 1977) or under regulations thereunder, *or revising regulations for enhanced monitoring and compliance with certification programs under section 114(a)(3) of this Act,* or any other final action of the Administrator under this Act (including any denial or disapproval by the Administrator under title I) which is local or regionally applicable may be filed only in the United States Court of Appeals for the appropriate circuit. Notwithstanding the preceding sentence a petition for review of any action referred to in such sentence may be filed only in the United States Court of Appeals for the District of Columbia if such action is based on a determination of nationwide scope or effect and if in taking such action the Administrator finds and publishes that such action is based on such a determination. Any petition for review under this subsection shall be filed within sixty days from the date notice of such promulgation, approval, or action appears in the Federal Register, except that if such petition is based solely on grounds arising after such sixtieth day, then any petition for review under this subsection shall be filed within sixty days after such grounds arise. *A petition for reconsideration by the Administrator of any other final agency action shall not render the action nonfinal for purposes of judicial review nor extend the time within which a petition for review may be filed, and shall not postpone the effectiveness of the agency action.*

(2) Action of the Administrator with respect to which review could have been obtained under paragraph (1) shall not be subject to judicial review in civil or criminal proceedings for enforcement. *Orders or notices issued under section 113(a), section 167 or section 303, subpoenas issued under section 307(a), and actions under sections 114, 206(c) and 208 of this Act may only be reviewed in a proceeding commenced by the United States under sections 113, 120, 204 or 205, or in a citizen suit under section 304, to enforce the order, notice, subpoena or action. No such order, notice, subpoena or action may be challenged in any citizen suit under section 304 unless the Administrator and the Attorney General are notified in writing of such challenge.*

(3) Where a final decision by the Administrator undertakes to perform an action, but defers such performance to a later time, any interested person may either challenge the deferral pursuant to paragraph (1) or bring an action at any time under section 304(a)(2) to compel such performance.

* * * * * * *

(e) Nothing in this Act shall be construed to authorize judicial review of regulations or orders of the Administrator under this Act, except as provided in this section. *Orders or notices issued under section 113(a), section 167 or section 303, subpoenas issued* *under section 307(a), and actions under sections 114, 206(c) and 208 of this Act may only be reviewed in a proceeding commenced by the United States under sections 113, 120, 204 or 205, or in a citizen suit under section 304, to enforce the order, notice, subpoena or action.*

* * * * * * *

(h) Petitions.—Any person may petition the Administrator to issue, amend, reconsider, or repeal any regulation or order issued under the authority of this Act. Within twelve months the Administrator shall either grant the petition or issue a final decision denying the petition, except that in the case of a petition for reconsideration under section 307(d)(7)(B), the Administrator shall grant or deny the petition within four months. In any case in which the Administrator grants a petition, the Administrator shall take final action in response to any such petition within a reasonable time.

* * * * * * *

APPROPRIATIONS

Sec. 326. (a) * * *

* * * * * * *

(c)(1) There are authorized to be appropriated $120,000,000 for each of the fiscal years ending September 30, 1991, 1992, 1993, 1994, and 1995 to make grants to the States pursuant to section 105. In addition there are authorized to be appropriated $50,000,000 for each of the fiscal years ending September 30, 1991, 1992, and 1993 to make grants to the States to prepare implementation plans as required by subpart 2, 3, or 4 of part D.

(2) There are authorized to be appropriated $90,000,000 for each of the fiscal years ending September 30, 1991, 1992, 1993, 1994, and 1995 to carry out the research and development activities authorized by sections 103 and 104 and other sections of this Act.

(3) In addition to the sums authorized by paragraphs (1) and (2) there are authorized to be appropriated $250,000,000 for each of the fiscal years ending September 30, 1991, 1992, 1993, 1994, and 1995 to carry out the activities authorized under this Act.

AIR POLLUTION FROM OUTER CONTINENTAL SHELF ACTIVITIES

Sec. 327. (a) Applicable Requirements.—Not later than twelve months after the enactment of this section, the Administrator, by rule, shall establish requirements to control air pollution from Outer Continental Shelf sources ("OCS sources"). Such requirements shall be the same as would be applicable if the source were located in the corresponding onshore area. Such requirements shall take effect with respect to new or modified sources on the date of promulgation and with respect to existing sources on the date twelve months thereafter. The authority of this section shall supersede any inconsistent authorities established under other law. Each requirement established under this section shall be treated, for purposes of sections 113, 114, 116, 120, and 304, as a standard under section 111.

(b) State Procedures.—Each State adjacent to an OCS source may develop and submit to the Administrator a procedure for implementing and enforcing the requirements promulgated by the Admin-

istrator under subsection (a) for OCS sources. If the Administrator finds that the State procedure is adequate he shall delegate to that State any authority he has under this Act to implement and enforce such requirements.

(c) Definitions.—For purposes of this section—

(1) The term 'Outer Continental Shelf' has the meaning provided by section 2 of the Outer Continental Shelf Lands Act (43 U.S.C. 1331).

(2) The term "corresponding onshore area" means, with respect to any OCS source, the onshore attainment or nonattainment area that is closest to the source, unless the Administrator determines that another area with more stringent requirements may reasonably be expected to be affected by such emissions. Such determination shall be based on the potential for air pollutants from the OCS source to reach the other onshore area and the potential of such air pollutants to affect the efforts of the other onshore area to attain or maintain any Federal, State, or local ambient air quality standard or to comply with the provisions of part C.

(3) The terms "Outer Continental Shelf Source" and "OCS source" includes any equipment, activity, or facility which (A) emits or has the potential to emit any air pollutant, (B) is regulated or authorized under the Outer Continental Shelf Lands Act, and (C) is located on the Outer Continental Shelf or in or on waters above the Outer Continental Shelf. Activities include, but are not limited to, exploration, construction, development, processing, and transportation. Emissions from any vessel servicing or associated with an OCS source, including emissions while at the OCS source or en route to or from the OCS source and the corresponding onshore area, shall be considered emissions from that OCS source.

INDIAN TRIBES

Sec. 328. (a) In General.—Subject to the provisions of subsection (b), the Administrator—

(1) is authorized to treat Indian tribes as States under this Act,

(2) may delegate to such tribes primary responsibility for assuring air quality and enforcement of air pollution control, and

(3) may provide such tribes grant and contract assistance to carry out functions provided by this title.

(b) EPA Regulations.—

(1) The Administrator shall, within eighteen months after the enactment of this section, promulgate final regulations specifying those provisions of this Act for which it is appropriate to treat Indian tribes as States. Such treatment shall be authorized only if—

(A) the Indian tribe is recognized by the Secretary of the Interior and has a governing body carrying out substantial governmental duties and powers;

(B) the functions to be exercised by the Indian tribe are within the area of the tribal government's jurisdiction; and

(C) the Indian tribe is reasonably expected to be capable, in the Administration's judgment, of carrying out the functions to be exercised in a manner consistent with the terms and purposes of this title and of all applicable regulations.

(2) Indian tribes shall not be treated as States for purposes of the last sentence of section 105(c). For any other provision of this Act where treatment of Indian tribes as identical to States is inappropriate, administratively infeasible or otherwise inconsistent with the purposes of this Act, the Administrator may include in the regulations promulgated under this section and such other provision. Nothing in this section shall be construed to allow Indian tribes to assume or maintain primary responsibility for assuring air quality and enforcement of air pollution control in a manner less protective of public health or welfare than such responsibility may be assumed or maintained by a State. An Indian tribe shall not be required to exercise criminal jurisdiction for purposes of complying with the proceeding sentence.

PART B—PERMITS

DEFINITIONS

SEC. 350. As used in this title—

(1) The term "affected source" shall have the meaning given in title IV.

(2) The term "major source" means any stationary source (or any group of stationary sources located within a contiguous area and under common control) that—

(A) is a major source as defined under section 112 or part D of this Act; or

(B) is a major stationary source as defined in section 302(j).

(3) For sources subject to standards issued under section 112 of this Act, the terms "new source", "stationary source", and "area source" shall have the meaning given in that section.

(4) For sources subject to standards issued under section 111 of this Act, the terms "new source", "modification", "existing source", "stationary source", and "owner or operator" shall have the meaning given in that section.

(5) The term "schedule of compliance" means a schedule of remedial measures including an enforceable sequence of actions or operations leading to compliance with an applicable implementation plan, emission standard, emission limitation, or emission prohibition.

(6) The term "permitting authority" means the Administrator, or the air pollution control agency authorized by the Administrator to carry out a permit program under this title.

PERMIT PROGRAMS

SEC. 351. (a) After the effective date of any permit program approved or promulgated under this title, it shall be unlawful for any person to violate any requirement of a permit issued under this title, or to operate a major source, any other source (including an area *source) subject to standards or regulations under section 111 or 112, any source required to have a permit under parts C or D of this Act, or any other source designated by regulations promulgated by the Administrator, except in compliance with a permit issued by a permitting authority under this title. Nothing in this subsection shall be construed to alter the requirements of sections 165, 172, and 173 regarding the requirement that a permit be obtained prior to construction. The Administrator may, in the Administrator's discretion, promulgate regulations to exempt one or more source categories from the requirements of this subsection if the Administrator finds that such an exemption would be consistent with the purposes of this Act.*

(b) Not later than twelve months after the date of enactment of this title, the Administrator shall promulgate regulations establishing the minimum elements of a permit program to be administered by any air pollution control agency. These elements shall include:

(1) Requirements for permit applications, including a standard application form.

(2) Monitoring and reporting requirements.

(3)(A) A requirement under State law that the owner or operator of each source subject to the requirement to obtain a permit under this title pay an annual fee, or the equivalent over some other period, sufficient to cover all direct and indirect costs of developing and administering the permit program, including, but not limited to, the reasonable costs of—

(i) reviewing and acting upon any application for such a permit,

(ii) if the owner or operator receives a permit for such source, whether before or after the date of enactment of this section, implementing and enforcing the terms and conditions of any such permit (not including any court costs or other costs associated with any enforcement action),

(iii) emissions and ambient monitoring,

(iv) preparing generally applicable regulations or guidance,

(v) modeling, analyses, and demonstrations, and

(vi) preparing inventories and tracking emissions.

(B) The total amount of fees collected by the permitting authority shall conform to the following requirements:

(i) The Administrator shall not approve a program as meeting the requirements of this paragraph unless the State demonstrates that, except as otherwise provided in subparagraphs (ii) through (v) of this subparagraph, the program will result in the collection, in the aggregate, from all sources subject to subparagraph (A), of an amount not less than $25 per ton of each regulated pollutant.

(ii) As used in this subparagraph, the term "regulated pollutant" shall mean (I) each pollutant regulated under section 111 or 112; and (II) each pollutant for which a national primary ambient air quality standard has been promulgated (except that ozone precursors, carbon monoxide, and PM-10 precursors shall be excluded from this reference).

(iii) The fee calculated under clause (i) shall be increased in each year beginning after the year of enactment of this section by the percentage, if any, by which the Consumer Price Index for the most recent calendar year ending before the beginning of such year exceeds the Consumer Price Index for the calendar year 1989.

(C)(i) If the Administrator determines, under section 502(d), that the fee provisions of the operating permit program do not meet the requirements of this paragraph, or if the Administrator makes a determination, under section 502(i), that the permitting authority is not adequately administering or enforcing an approved fee program, the Administrator may, in addition to taking any other action authorized under this title, collect reasonable fees from the sources identified under subparagraph (A) without regard to the requirements of paragraph (B).

(ii) Any source that fails to pay fees lawfully imposed by the Administrator under this subparagraph shall pay a penalty of 50 per centum of the fee amount, plus interest on the fee amount computed in accordance with section 6621(a)(2) of title 26, of the United States Code (relating to computation of interest on underpayment of Federal taxes).

(iii) Any fees, penalties, and interest collected under this subparagraph shall be deposited in a special fund in the United States Treasury for licensing and other services, which thereafter shall be available for appropriation, to remain available until expended, subject to appropriation, to carry out the Agency's activities for which the fees were collected.

Any fee required to be collected by a State or interstate agency under this subsection shall be utilized to support the air pollution control program of such State or interstate agency.

(4) Requirements for adequate personnel and funding to administer the program.

(5) A requirement that the permitting authority have adequate authority to—

(A) issue permits that apply, and assure compliance by all sources required to have a permit under this title with each applicable standard, regulation or requirement under this Act;

(B) issue permits for a fixed term, not to exceed five years;

(C) assure that permits incorporate emission limitations and other requirements in an applicable implementation plan;

(D) terminate, modify, or revoke and reissue permits for cause;

(E) enforce permits, permit fee requirements, and the requirement to obtain a permit, including authority to recover civil penalties in an amount not less than $10,000 per day for each violation, and appropriate criminal penalties; and

(F) assure that no permit will be issued if the Administrator timely objects to its issuance under section 505.

(6) Adequate procedures for public notice, including offering an opportunity for public comment and a hearing, on any permit application.

(7) Authority to make available to the public any permit application, compliance plan, permit, and monitoring or compliance report under section 503(e).

(c) A single permit may be issued for a facility with multiple sources.

(d) Not later than three years after the enactment of this title, the Governor of each State shall develop and submit to the Administrator a permit program under State law or under an interstate compact meeting the requirements of this title. In addition, the Governor shall submit a legal opinion from the attorney general (or the attorney for those State air pollution control agencies that have independent legal counsel), or from the chief legal officer of an interstate agency, that the laws of the State, locality or the interstate compact provide adequate authority to carry out the program. Not later than one year after receiving a program, and after notice and opportunity for public comment, the Administrator shall approve or disapprove such program, in whole or in part. The Administrator may approve a program to the extent that the program meets the requirements of this Act, including the regulations issued under subsection (b) of this section. If the program is disapproved, in whole or in part, the Administrator shall notify the Governor of any revisions or modifications necessary to obtain approval. The Governor shall revise and resubmit the program for review under this section within one hundred and eighty days after receiving notification. If the Governor fails within such period to resubmit an approvable program, the Administrator—

(1) shall, to the extent the permit program would implement an applicable implementation plan, withhold final action on plan revisions affecting one, or a limited group of, major sources; and

(2) may in the Administrator's discretion take either or both of the following actions:

(A) apply any of the sanctions specified in section 179(b) of this Act other than the sanction specified in section 179(b)(2); or

(B) promulgate a program, or partial program, under this title.

(e) The Administrator shall suspend the issuance of permits promptly upon publication of notice of approval of a permit program under this section, but may in such notice retain jurisdiction over permits that have been federally issued, but for which the administrative or judicial review process is not complete. The Administrator shall continue to administer and enforce federally issued permits under this title until they are replaced by a permit issued by a permitting program. Nothing in this provision should be construed to limit the Administrator's ability to enforce permits issued by a State.

(f) The Governor of a State may submit, and the Administrator may approve, a partial permit program. No partial permit program shall be approved unless, at a minimum, it applies, and assures compliance with, this title and—

(1) all requirements established under title IV applicable to "affected sources";

(2) all requirements established under section 112 applicable to "major sources", "area sources", and "new sources"; or

(3) all requirements of title I (other than section 112) applicable to sources required to have a permit under this title.

Approval of a partial program shall not relieve the State of its obligation to submit a complete program, nor from the application of any sanctions under this Act for failure to submit an approvable permit program.

(g) INTERIM APPROVAL.—If a program (including a partial permit program) submitted under this title substantially meets the requirements of this title, but is not fully approvable, the Administrator may by rule grant the program interim approval. In the notice of final rulemaking, the Administrator shall specify the changes that must be made before the program can receive full approval. An interim approval under this subsection shall expire on a date set by the Administrator not later than two years after such approval, and may not be renewed.

(h) EFFECTIVE DATE.—The effective date of a permit program, or partial or interim program, approved under this title, shall be the effective date of approval by the Administrator.

(i) Whenever the Administrator makes a preliminary determination that a permitting authority is not adequately administering and enforcing a program, or portion thereof, in accordance with the requirements of this title, he shall notify the permitting authority of such determination and the reasons therefor. If the permitting authority fails to take action to assure adequate administration and enforcement, the Administrator may in the Administrator's discretion, but not before ninety days after issuing such notice, take one or more of the following actions:

(1) withdraw approval of the program or portion by rule;

(2) propose to apply any of the sanctions specified in section 179(b) of this Act other than the sanction specified in section 179(b)(2); or

(3) promulgate a program, or portion of a program, under this title.

PERMIT APPLICATIONS

SEC. 352. (a) Any source specified in section 502(a) shall become subject to a permit program, and required to have a permit, on the later of the following dates:

(1) the effective date of a permit program or partial or interim permit program applicable to the source; or

(2) the date such source becomes subject to section 502(a).

(b) The regulations required by section 502(b)(1) shall include a requirement that the owner or operator submit with the permit application a compliance plan describing how the source will comply with all applicable requirements under this Act. The compliance plan shall include a schedule of compliance, and a schedule under which the owner or operator will submit progress reports to the permitting authority no less frequently than every six months. The regulations shall further require any owner or operator submitting a

compliance plan to periodically certify that the facility is in compliance with any applicable requirements under this Act, and to promptly report any violations of such requirements to the permitting authority.

(c) The owner or operator of any source required to have a permit shall, not later than six months after the date on which the source becomes subject to a permit program approved or promulgated under this title, or such earlier date as the permitting authority may establish, submit to the permitting authority a compliance plan and an application for a permit signed by a responsible corporate official, who shall certify the accuracy of the information submitted.

(d) Except for sources required to have a permit prior to construction under sections 165, 172, or 173, if an owner or operator has submitted a timely and complete application for a permit required by this title, but final action has not been taken on the application, the source's failure to have a permit shall not be a violation of this Act, unless the delay in final action was due to the failure of the applicant to timely submit information required or required to process the application. No source required to have a permit under this title shall be in violation of section 502(a) before the date on which the source is required to submit an application under subsection (c) of this section.

(e) A copy of each permit application, compliance plan, emissions or compliance monitoring report, certification, and each permit issued under this title, shall be available to the public. If an applicant is required to submit information entitled to protection from disclosure under section 114(c) of this Act, the applicant may submit such information separately from the application. The requirements of section 114(c) shall apply to such information. The contents of a permit or of a compliance plan shall not be entitled to protection under section 114(c).

PERMIT REQUIREMENTS AND CONDITIONS

SEC. 353. (a) Each permit issued under this title shall include emission limitations and standards, a schedule of compliance, and such other conditions as are necessary to assure compliance with applicable requirements.

(b) The Administrator may by rule prescribe procedures and methods for determining compliance and for monitoring and analysis of pollutants regulated under this Act.

(c) Each permit issued under this title shall set forth inspection, entry, monitoring, compliance certification, and reporting requirements to assure compliance with the permit terms and conditions. Such monitoring and reporting requirements shall conform to any applicable regulations under subsection (b) of this section. Any report required to be submitted by a permit under this title shall be signed by a responsible corporate official, who shall certify its accuracy.

(d) The permitting authority may, after notice and opportunity for public hearing, issue a general permit covering numerous similar sources. Any general permit shall comply with all requirements applicable to permits under this title. No source covered by a general

permit shall thereby be relieved from the obligation to file an application under section 503.

(e) The permitting authority may issue a single permit to an owner or operator authorizing emissions from similar operations at multiple temporary locations. No such permit shall be issued unless it includes conditions that will assure compliance with all the requirements of this Act at all authorized locations, including, but not limited to, ambient standards and compliance with any applicable increment or visibility requirements under part C of title I. Any such permit shall in addition require the owner or operator to notify the permitting authority in advance of each change in location. The permitting authority may require a separate permit fee for operations at each location.

(f)(1) A permit may not be reissued or modified to contain emission limitations or other requirements that are less stringent than the comparable emission limitations or requirements in the previous permit or that applied to the source under an applicable implementation plan.

(2) Notwithstanding paragraph (1) of this subsection, a permit may be reissued or modified, in accordance with section 405 of this title, to contain a less stringent emission limitation or other requirement (other than standards established under section 111 or 112) if the applicant shows that the revised emission limitation or requirement is consistent with any demonstration of attainment and any progress requirement in an approved implementation plan, the requirements of part C or section 173 of the Act, and will not otherwise interfere with attainment of the ambient air quality standards, progress requirements, and any other requirements of this Act and that——

(A) the increased emissions authorized by the permit are compensated for by emissions reduction from another permitted facility, as determined under rules prescribed by the Administrator;

(B) material and substantial alterations or additions to the permitted source occurred after permit issuance;

(C) information is available that was not available at the time of permit issuance (other than revised regulations, guidance, or test methods) and that, if known, would have justified the application of a less stringent emission limitation or requirement at that time;

(D) technical mistakes or mistaken interpretations of law were made in issuing the permit; or

(E) the permittee demonstrates, in accordance with procedures prescribed by the Administrator, that it has installed the controls required to meet the emission limitations and requirements in the permit and has properly constructed and tested the facility, but has nevertheless been unable to achieve the emission limitations specified in the permit, in which case the limitations in the revised, reissued, or modified permit may reflect the level of emission control actually achieved.

(3) No permit may be reissued to contain emission standards less stringent than those established under sections 111 or 112 unless the applicable standard has been revised.

(g)(1) Compliance with a permit issued under this title shall be deemed compliance with section 502. Except as otherwise provided by the Administrator by rule, the permit may also provide that compliance with the permit shall be deemed compliance with other applicable provisions of this Act. Compliance with a permit issued under a partial program under section 502(f) shall be deemed compliance only with those requirements for which the program was approved. For purposes of this subsection, "Compliance with a permit" means compliance with all terms, conditions and requirements of a permit including all modifications made to such permit by rule or order subsequent to issuance of permit.

(2) Notwithstanding the provisions of paragraph (1), compliance with a permit issued under this title or under a partial program under section 502(f) shall not alter, modify or otherwise affect the authority of the Administrator under section 303 (emergency powers) or the requirement to comply with any order issued under section 303.

NOTIFICATION TO ADMINISTRATOR AND CONTIGUOUS STATES

SEC. 354. (a)(1) Each permitting authority shall transmit to the Administrator a copy of each permit application, including any compliance plan, or for a permit modification, submitted under this title, and shall provide notice, in accordance with regulations promulgated by the Administrator, of every action related to the consideration of the application, including each permit proposed to be issued by the authority.

(2) The permitting authority shall notify all States contiguous to the State in which the emission originates of each permit application, and each draft permit or proposed permit forwarded to the Administrator under this section, and shall provide an opportunity for such States to submit written recommendations respecting the issuance of the permit and its terms and conditions. If any part of those recommendations are not accepted by the permitting authority, such authority shall notify the State submitting the recommendations and the Administrator in writing of its failure to accept those recommendations and the reasons therefor.

(b) No permit shall be issued if the Administrator (1) within ninety days after receipt of the proposed permit under subsection (a)(1) of this section, or (2) within ninety days after receiving notification under subsection (a)(2), objects in writing to its issuance as not in compliance with the requirements of this Act, including the requirements of section 110(d)(4)(A). The Administrator shall provide with the objection a statement of the reasons for the objection.

(c) If the permitting authority fails within ninety days after the date of the objection, to submit a permit revised to meet the objection, the Administrator may issue or deny the permit in accordance with the requirements of this title. No objection shall be subject to judicial review until the Administrator takes final action to issue or deny a permit under this subsection.

(d)(1) The Administrator may waive the requirements of subsections (a) and (b) of this section at the time of approval of a permit program under this title for any category (including any class, type, or size within such category) of sources covered by the program.

(2) The Administrator may by regulation establish categories of sources (including any class, type, or size within such category) to which the requirements of subsections (a) and (b) of this section shall not apply.

(3) The Administrator may exclude from any waiver under this subsection notification under paragraph (a)(2). Any waiver granted under this subsection may be revoked or modified by the Administrator by rule.

(e) If the Administrator finds that cause exists under section 502(b)(5)(D) to terminate, modify, or revoke and reissue a State permit under this title, the Administrator shall notify the permitting authority of such finding. The permitting authority shall, within ninety days after receipt of such notification, forward to the Administrator under this section a proposed determination of termination, modification, or revocation and reissuance, as appropriate. The Administrator may extend such ninety-day period for an additional ninety days if the Administrator finds that a new or revised permit application is necessary, or that the permitting authority must require the permittee to submit additional information. The Administrator may review such proposed determination under the provisions of subsections (a) and (b) of this section. If the permitting authority fails to submit the required proposed determination, or if the Administrator objects and the permitting authority fails to resolve the objection within the period prescribed in subsection (c) of this section, the Administrator may terminate, modify, or revoke and reissue the permit.

RELATION TO OTHER AUTHORITY

SEC. 355. (a) Nothing in this title shall prevent a State or interstate permitting authority from establishing additional permitting requirements not inconsistent with this Act.

(b) ACID DEPOSITION PROGRAM.—Nothing in this title shall be construed to authorize the Administrator, or a State, to modify or revoke any allowance granted under title IV, or to alter or amend any provision of title IV.

TITLE IV—ACID DEPOSITION CONTROL

FINDINGS AND PURPOSES

SEC. 401. (a) FINDINGS. —The Congress finds that—

(1) the presence of acidic compounds and their precursors in the atmosphere and in deposition from the atmosphere represents a threat to natural resources, ecosystems, materials, visibility, and public health;

(2) the principal sources of the acidic compounds and their precursors in the atmosphere are emissions of sulfur and nitrogen oxides from the combustion of fossil fuels;

(3) the problem of acid deposition is of national and international significance;

(4) strategies and technologies for the control of precursors to acid deposition exist now that are economically feasible, and improved methods are expected to become increasingly available over the next decade;

(5) current and future generations of Americans will be adversely affected by delaying measures to remedy the problem;

(6) reduction of total atmospheric loading of sulfur dioxide and nitrogen oxides will enhance protection of the public health and welfare and the environment; and

(7) control measures to reduce precursor emissions from steam-electric generating units should be initiated without delay.

(b) PURPOSES.—The purpose of this title is to reduce the adverse effects of acid deposition through reductions in annual emissions of sulfur dioxide of ten million tons from 1980 emission levels, and, in combination with other provisions of this Act, of nitrogen oxides emissions of approximately two million tons from 1980 emission levels, in the forty-eight contiguous States and the District of Columbia. It is also the purpose of this title to encourage energy conservation, use of renewable and clean alternative technologies, and pollution prevention as a long-range strategy for reducing air pollution and other adverse impacts of energy production and use.

DEFINITIONS

SEC. 402. As used in this title—

(a) The term "affected source" means a source that includes one or more affected units.

(b) The term "affected unit" means a unit that is subject to emission reduction requirements or limitations under sections 404, 405, 406, 407, or 410 of this title.

(c) The term "allowance" means an authorization, issued to an affected source by the Administrator under this title, to emit, during a specified calendar year, one ton of sulfur dioxide or nitrogen oxides.

(d) The term "baseline" means the annual quantity of fossil fuel consumed, measured in millions of British Thermal Units ("mmBtu's"), by an affected unit, calculated as follows:

(1) For each steam-electric generating utility unit that was in commercial operation prior to January 1, 1985, the baseline shall be the annual average quantity of mmBtu's consumed in fuel during calendar years 1985, 1986, and 1987, as recorded by the Department of Energy pursuant to Form 767. For any unit for which such form was not filed, the baseline shall be the level specified for such unit in the 1985 National Acid Precipitation Assessment Program (NAPAP) Emissions Inventory, Version 2, National Utility Reference file (NURF). For other units, the baseline is the NAPAP Emissions Inventory, Version 2. The Administrator may exclude periods during which a unit is shutdown for a continuous period of four months or longer.

(2) For each steam-electric generating utility unit that entered operation on or after January 1, 1985, the baseline shall be an annual average quantity of mmBtu; as calculated pursuant to a method which the Administration shall prescribe, by regulation to be promulgated not later than one year after the date of enactment of the Clean Air Act Amendments of 1989.

(3) For any other unit, the baseline shall be the annual average quantity, in mmBtu consumed in fuel by that unit, as established by regulation to be promulgated by the Administrator not later than eighteen months after enactment of the Clean Air Act Amendments of 1989.

(e) The term "capacity factor" means the ratio between the actual electric output from a unit and the potential electric output from that unit.

(f) The term "compliance plan" means a plan submitted pursuant to section 408 describing how the source will comply with all applicable requirements under this title, including a schedule for compliance and certification by the owner or operator that the facility is in compliance with the requirements of this title.

(g) The term "continuous emission monitor" (CEM) means the equipment used to sample, analyze, measure, and provide on a continuous basis a permanent record of emissions and flow (expressed in pounds per million British thermal units (lbs/mmBtu) and pounds per hour (lbs/hr)) or such other forms as the Administrator may prescribe by regulations under section 412 of this title.

(h) The term "existing unit" means a unit (including units subject to section 111) that is operating prior to the date of enactment of the Clean Air Act Amendments of 1989. Any unit modified, reconstructed, or repowered after the date of enactment of the Clean Air Act Amendments of 1989 shall continue to be an existing unit for the purposes of this title.

(i) The term "generating unit" means a turbine together with its generator reported pursuant to Department of Energy Form 860.

(j) The term "new unit" means a unit that commences operation on or after the date of enactment of the Clean Air Act Amendments of 1989.

(k) The term "permitting authority" means the Administrator or the air pollution control agency, as defined under section 302(b).

(l) The term "repowering" means replacement of an existing coal fired coal boiler with one of the following clean coal technologies: atmospheric or pressurized fluidized bed combustion, integrated gasification combined cycle, magnetohydrodynamics, direct and indirect coal-fired turbines, integrated gasification fuel cells, or a derivative of one of these techniques, as determined by the Administrator, in consultation with the Secretary of Energy.

(m) The term "State" means one of the forty-eight contiguous States and the District of Columbia.

(n) The term "unit" means a fossil fuel-fired combustion device.

(o) The term "actual 1985 emission rate for electric utility units" means the annual average sulfur dioxide or nitrogen oxides emission rate in units of pounds per million Btu as reported in the NAPAP Emissions Inventory, Version 2, National Utility Reference File. For non-utility units, the term "actual 1985 emission rate" means the annual average sulfur dioxide or

nitrogen oxides emission rate in units of pounds per million Btu as reported in the NAPAP Emission Inventory, Version 2.

(p) The term "utility unit" means a unit that produces electricity for sale. For purposes of this title, a unit that cogenerates steam and electricity shall be considered a utility unit if the unit is constructed for the purposes of supplying more than one-third of its potential electric output capacity and more than 25 megawatts electrical output to any utility power distribution system for sale.

ALLOWANCE PROGRAM FOR EXISTING AND NEW UNITS

SEC. 403. (a) ALLOCATIONS OF ANNUAL ALLOWANCES FOR EXISTING AND NEW UNITS.—(1) For the emission limitation programs under this title, the Administrator shall allocate annual allowances to the owner or operator of the affected units at an affected source in an amount equal to the annual tonnage emission limits calculated under sections 404, 405, 406, 407, and 410 except as otherwise specifically provided in section 405 (c) and (h) and elsewhere in this title. Subject to the provisions of paragraph (2) of this subsection, the Administrator shall issue allowances for each affected unit at an affected source at the time the permit is issued for such source, as provided in section 408. If an existing unit subject to the requirements of sections 404, 405, 406, or 407 is removed from commercial operation, the annual allocation of allowances shall continue to be issued to the owner or operator for each five year period in accordance with the schedule for issuance of permits pursuant to sections 352 and 408.

(2)(A) The Administrator shall issue to the owner or operator of each affected unit allowances in an amount equal to 98 per centum of the total number of allowances allocated to that unit. Each unit's remaining allowances shall be deposited in a reserve to be controlled by the Administrator as provided in this paragraph.

(B) Pursuant to the regulations promulgated under this paragraph the Administrator shall sell to the owners or operators of units subject to the requirements of subsection (e) of this section the allowances deposited in the reserve created in accordance with subparagraph (A). Not later than 36 months after the date of enactment of the Clean Air Act Amendments of 1989, the Administrator shall promulgate regulations providing for the establishment of a reservation list for the sale of such allowances, qualifications for the owners and operators seeking such sales, requirements for a showing that allowances are not otherwise available from persons holding allowances pursuant to this section, and such other requirements as the Administrator deems necessary. The regulations shall also provide for the issuance of allowances from the reserve to the owners or operators of units described in section 405(h).

(C) The Administrator shall determine whether each applicant meets the requirements of the regulations, and shall allocate allowances in an appropriate amount to each qualified applicant upon receipt of payment of $1,500 per ton (adjusted for inflation based on the Consumer Price Index beginning on the date of enactment of the Clean Air Act Amendments of 1989 and annually thereafter). Payment shall be made to the United States Treasury, as provided by

regulation pursuant to regulations promulgated under paragraph (B).

(D) All monies collected, and any allowances remaining in the reserve at the end of each phase, or five-year period as defined in accordance with the schedule for issuance of permits pursuant to sections 351 and 408 that are not issued as provided in this subsection, shall be issued to the owners or operators of the affected units from which the allowances were withheld, on a pro rata basis.

(b) ALLOWANCE SYSTEM.—Allowances issued under this title may be transferred among the owners or operators of affected sources under this title or other persons who lawfully acquire such allowances, as provided by regulations to be promulgated by the Administrator not later than eighteen months after the date of enactment of the Clean Air Act Amendments of 1989. The Administrator shall promulgate regulations, not later than eighteen months after enactment, to establish the allowance system prescribed under this section, including, but not limited to, requirements for the issuance, transfer, and use of allowances under this title. Such regulations shall prohibit the use of allowances prior to the calendar year for which the allowances were issued, and shall provide, consistent with the purposes of this title, for the identification of unused allowances, and for such unused allowances to be carried forward and added to allowances allocated in subsequent years. Such regulations shall permit transfers only within each of the two major geographic regions of the country as defined by such regulations. Nothing in the regulations shall relieve the Administrator of the Administrator's permitting, monitoring and enforcement obligations under this Act nor relieve sources of their requirements and liabilities under this Act. Transfers of allowances shall not be effective until written certification of the transfer, signed by a responsible official of each party to the transfer, is received and recorded by the Administrator.

(c) INTERPOLLUTANT TRADING.—The regulations under subsection (b) shall provide for trading and banking of sulfur dioxide and nitrogen oxide allowances. Such rules shall provide that, for trading purposes, 1.5 pounds of nitrogen oxides shall be equivalent to 1.0 pound of sulfur dioxide. Interpollutant trades of these pollutants in areas failing to meet the national ambient air quality standards shall be subject to approval by the Administrator.

(d) ALLOWANCE TRACKING SYSTEM.—The Administrator shall promulgate, not later than eighteen months after the date of enactment of the Clean Air Act Amendments of 1989, a system for issuing, recording, and tracking allowances and shall specify procedures and requirements. All allowance allocations and transfers shall upon recordation by the Administrator be deemed a part of each unit's permit requirements pursuant to section 408, but shall not require permit review and revision.

(e) NEW UTILITY UNITS.—The owner or operator of each new utility unit must hold allowances equal to the annual tonnage of sulfur dioxide emitted by such unit after January 1, 2000. Such new utility units shall not be eligible for an allocation of sulfur dioxide allowances under subsection (a). Notwithstanding the geographic limitations on transfers of allowances in subsection (b), new utility units may obtain allowances from any unit allocated allowances under

this title. After January 1, 2000, it shall be unlawful for any new utility unit to emit sulfur dioxide in an amount exceeding the allowances the owner or operator of such unit holds for such unit. The owner or operator of any new utility unit in violation of this subsection shall be liable for fulfilling the obligations specified in section 411 of this title.

(f) NATURE OF ALLOWANCES.—An allowance issued under this title is a limited authorization to emit sulfur dioxide or nitrogen oxides in accordance with the provisions of this title. Such allowances may be limited, revoked or otherwise modified in accordance with the provisions of this title or other authority of the Administrator. Such allowance does not constitute a property right.

(g) PROHIBITION.—It shall be unlawful for any person to hold or transfer any allowance issued under this title, except in accordance with regulations issued by the Administrator.

PHASE I SULFUR DIOXIDE REQUIREMENTS

SEC. 404. (a) EMISSION LIMITATIONS.—After January 1, 1995, each source that includes one or more affected units listed in Table A for phase I is an affected source under this section. After January 1, 1995, it shall be unlawful for any affected unit to emit sulfur dioxide in excess of the tonnage limitation stated in table A unless the emissions reduction requirements applicable to such unit have been achieved pursuant to subsection (b) or the owner or operator of such unit has obtained allowances equal to the emissions in excess of those permitted under Table A, pursuant to section 403. The owner or operator of any unit in violation of this section shall be liable for fulfilling the obligations specified in section 411 of this title. The annual limitation for any unit totaled on Table A shall equal the product of each unit's baseline multiplied by an emission rate of 2.5 lbs/mmBtu, divided by 2,000.

(b) SUBSTITUTIONS.—The owner or operator of an affected unit under subsection (a) may submit a proposal to the Administrator to reassign, in whole or in part, the sulfur dioxide reduction requirements to any other unit(s) under the control of such owner or operator. Such proposal shall specify—

(1) the designation of the substitute affected units to which any part of the reduction obligations of subsection (a) shall apply, in addition to, or in lieu of, the original affected units designated under such subsection;

(2) the baseline, the actual 1985 sulfur dioxide emissions rate, and the authorized annual tonnage limitation stated in Table A for the original affected unit;

(3) calculation of the calendar year 1985 annual tonnage emitted by the substitute units, based on the baseline for each unit, as defined in section 402(d), multiplied by the unit's actual 1985 emission rate;

(4) the emission rates and the actual tonnage limitations that would be applicable to the original and substitute affected units;

(5) documentation, to the satisfaction of the Administrator, that the reassigned tonnage limits will, in total, achieve the

same or greater emissions reduction than would have been achieved without such substitutions; and

(6) such other information as the Administrator may require.

(c) Administrator's Action on a Proposal.—

(1) The Administrator shall approve or disapprove such substitution not later than six months after receipt of a substitution proposal that fulfills the requirements of this subsection. If a proposal does not meet the requirements of subsection (d), the Administrator shall disapprove it. The owner or operator of a unit listed in Table A may not substitute another unit without the approval of the Administrator.

(2) For an approved proposal, each substitute unit and source shall be deemed affected under this title, and the Administrator shall act on the submission in accordance with section 408. The Administrator shall allocate allowances for the affected units in accordance with the approved proposal pursuant to section 403. It shall be unlawful for any source or unit that receives allowances pursuant to this section to emit sulfur dioxide in an amount in excess of the allowances allocated to it. The owner or operator of any unit in violation of this subsection shall be liable for fulfilling the obligations specified in section 411 of this title. For a disapproved proposal, the Administrator shall issue allowances in accordance with subsection (a).

Table A

Affected sources and units in phase I and their sulfur dioxide allowances (tons) in phases I and II

State	Plant name	Unit	Phase I allowances	Phase II allowances
Alabama	Colbert	1	13,600	6,520
		2	15,300	7,350
		3	15,400	7,390
		4	15,400	7,400
		5	37,200	17,800
	E.C. Gaston	1	18,100	8,690
		2	18,500	8,900
		3	18,300	8,790
		4	19,300	9,250
		5	59,800	28,700
Florida	Big Bend	1	28,400	13,600
		2	27,100	13,000
		3	26,700	12,800
	Crist	6	19,200	9,200
		7	28,100	13,500
Georgia	Bowen	1	54,800	26,300
		2	56,300	27,000
		3	71,800	34,400
		4	71,700	34,400
	Hammond	1	8,780	4,220
		2	9,220	4,420
		3	8,910	4,280
		4	37,600	18,100
	Jack McDonough	1	19,900	9,550
		2	20,600	9,880
	Wansley	1	70,800	34,000

TABLE A—CONTINUED

State	Plant name	Unit	Phase I allowances	Phase II allowances
		2	65,400	31,400
	Yates	1	7,200	3,460
		2	7,040	3,380
		3	6,950	3,340
		4	8,910	4,280
		5	9,410	4,520
		6	24,800	11,900
		7	21,500	10,300
Illinois	Baldwin	1	42,000	20,200
		2	44,400	21,300
		3	42,600	20,400
	Coffeen	1	11,800	5,600
		2	35,700	17,100
	Grand Tower	4	5,910	2,840
	Hennepin	2	18,400	8,820
	Joppa Steam	1	12,600	6,040
		2	10,800	5,170
		3	12,300	5,890
		4	11,400	5,450
		5	11,400	5,480
		6	10,600	5,100
	Kincaid	1	31,500	15,100
		2	29,100	14,000
	Meredosia	3	13,900	6,670
	Vemillion	2	8,880	4,260
Indiana	Bailly	7	11,100	5,320
		8	12,400	5,970
	Breed	1	18,500	8,880
	Cayuga	1	33,400	16,000
		2	34,100	16,400
	Clifty Creek	1	20,200	9,670
		2	19,800	9,510
		3	20,400	9,800
		4	20,100	9,640
		5	19,400	9,290
		6	20,400	9,780
	Elmer W. Stout	5	3,880	1,860
		6	4,770	2,290
		7	23,600	11,300
	F.B. Culley	2	3,100	1,490
		3	17,000	8,140
	Frank E. Ratts	1	8,330	4,000
		2	8,480	4,070
	Gibson	1	40,400	19,400
		2	41,000	19,700
		3	41,100	19,700
		4	40,300	19,400
	H.T. Pritchard	6	5,770	2,770
	Michigan City	12	23,000	11,100
	Petersburg	1	16,400	7,890
		2	32,400	15,500
	R. Gallagher	1	4,690	2,250
		2	7,280	3,490
		3	6,530	3,130
		4	6,800	3,270
	Tanners Creek	4	24,800	11,900
	Wabash River	1	3,400	1,920
		2	2,860	1,370
		3	3,750	1,800
		5	3,670	1,760

TABLE A—CONTINUED

State	Plant name	Unit	Phase I allowances	Phase II allowances
		6	12,300	5,890
	Warrick	4	27,000	12,900
Iowa	Burlington	1	10,700	5,140
	Des Moines	7	1,680	805
	Milton L. Kapp	2	13,800	6,610
	Prairie Creek	4	8,180	3,920
	Riverside	5	3,300	1,590
Kansas	Quindaro	2	4,130	1,980
Kentucky	Coleman	1	11,200	5,390
		2	12,800	6,160
		3	12,300	5,930
	Cooper	1	7,450	3,570
		2	15,300	7,360
	E.W. Brown	1	7,110	3,410
		2	10,900	5,240
		3	26,100	12,500
	Elmer Smith	1	5,440	2,610
		2	14,400	6,920
	Ghent	1	28,400	13,600
	Green River	4	7,820	3,750
	H.L. Spurlock	1	22,800	10,900
	Henderson II	1	13,300	6,410
		2	12,300	5,910
	Paradise	3	59,200	28,400
	Shawnee	10	10,200	4,880
Maryland	Chalk Point	1	21,900	10,500
		2	23,900	11,700
	C.P. Crane	1	10,300	4,960
		2	9,230	4,430
	Morgantown	1	35,200	16,900
		2	38,500	18,500
Michigan	J.H. Campbell	1	19,300	9,250
		2	23,100	11,100
Mississippi	Jack Watson	4	17,800	8,540
		5	36,500	17,500
Missouri	Asbury	1	16,200	7,770
	James River	5	4,830	2,320
	Labadie	1	35,700	17,100
		2	37,700	18,100
		3	40,300	19,400
		4	35,900	17,300
	Montrose	1	7,390	3,550
		2	8,200	3,940
		3	10,100	4,840
	New Madrid	1	28,200	13,600
		2	32,500	15,600
	Sibley	3	15,600	7,480
	Sioux	1	22,600	10,800
		2	21,100	10,100
	Thomas Hill	1	10,300	4,920
		2	17,200	8,270
New Hampshire	Merrimack	1	10,200	4,890
		2	22,000	10,600
New Jersey	B.L. England	1	9,060	4,350
		2	11,700	5,630
New York	Dunkirk	3	12,600	6,050
	Milliken	1	8,380	4,020
		2	12,400	5,960
	Northport	1	19,800	9,510
		2	24,100	11,600

TABLE A—CONTINUED

State	*Plant name*	*Unit*	*Phase I allowances*	*Phase II allowances*
		3	26,500	12,700
	Port Jefferson	3	10,500	5,030
		4	12,300	5,920
Ohio	Ashtabula	5	16,700	8,040
	Avon Lake	8	11,700	5,590
		9	30,500	14,600
	Cardinal	1	34,300	16,400
		2	38,300	18,400
	Conesville	1	4,210	2,020
		2	4,890	2,350
		3	5,500	2,640
		4	48,800	23,400
	Eastlake	1	7,800	3,750
		2	8,640	4,150
		3	10,000	4,810
		4	14,500	6,970
		5	34,100	16,400
	Gen. J.M. Gavin	1	79,100	38,000
		2	80,600	38,700
	Kyger Creek	1	19,300	9,260
		2	18,600	8,910
		3	17,900	8,600
		4	18,700	8,980
		5	18,700	9,000
	Miami Fort	6	11,400	5,460
		7	38,500	18,500
	Muskingum River	1	14,900	7,140
		2	14,200	6,800
		3	14,000	6,700
		4	11,800	5,650
		5	40,500	19,400
	Niles	1	6,940	3,330
		2	9,100	4,370
	Picway	5	4,930	2,370
	R.E. Burger	3	3,080	1,480
		4	10,800	5,170
		5	12,400	5,970
	W.H. Sammis	5	24,200	11,600
		6	39,900	19,200
		7	43,200	20,700
	W.C. Beckjord	5	8,950	4,290
		6	23,000	11,000
Pennsylvania	Armstrong	1	14,400	6,920
		2	15,400	7,410
	Brunner Island	1	27,800	13,300
		2	31,100	14,900
		3	53,800	25,800
	Cheswick	1	39,000	18,700
	Conemaugh	1	59,800	28,700
		2	66,400	31,900
	Hatfield's Ferry	1	37,800	18,200
		2	37,300	17,900
		3	40,300	19,300
	Homer City	1	40,100	19,200
		2	34,700	16,700
	Martins Creek	1	12,700	6,080
		2	12,800	6,150
	Portland	1	5,940	2,850
		2	10,200	4,910
	Shawville	1	10,300	4,960

TABLE A—CONTINUED

State	*Plant name*	*Unit*	*Phase I allowances*	*Phase II allowances*
		2	*10,300*	*4,960*
		3	*14,200*	*6,830*
		4	*14,100*	*6,760*
	Sunbury	*3*	*8,760*	*4,210*
		4	*11,500*	*5,500*
Tennessee	*Allen*	*1*	*15,300*	*7,360*
		2	*16,800*	*8,050*
		3	*15,700*	*7,520*
	Cumberland	*1*	*86,700*	*41,600*
		2	*94,800*	*45,500*
	Gallatin	*1*	*17,600*	*8,470*
		2	*17,300*	*8,310*
		3	*20,000*	*9,610*
		4	*21,300*	*10,200*
	Johnsonville	*1*	*7,790*	*3,740*
		2	*8,040*	*3,860*
		3	*8,410*	*4,040*
		4	*7,990*	*3,830*
		5	*8,240*	*3,950*
		6	*7,890*	*3,790*
		7	*8,980*	*4,310*
		8	*8,700*	*4,180*
		9	*7,080*	*3,400*
		10	*7,550*	*3,630*
West Virginia	*Albright*	*3*	*10,700*	*5,120*
	Fort Martin	*1*	*41,600*	*20,000*
		2	*41,200*	*19,800*
	Harrison	*1*	*8,600*	*23,300*
		2	*46,100*	*22,100*
		3	*41,500*	*19,900*
	Kammer	*1*	*18,700*	*9,000*
		2	*19,500*	*9,340*
		3	*17,400*	*8,350*
	Mitchell	*1*	*44,000*	*21,100*
		2	*45,500*	*21,800*
	Mount Storm	*1*	*43,700*	*21,000*
		2	*35,600*	*17,100*
		3	*42,400*	*20,400*
Wisconsin	*Edgewater*	*4*	*24,700*	*11,900*
	La Crosse/Genoa	*3*	*19,100*	*9,160*
	Nelson Dewey	*1*	*6,010*	*2,880*
		2	*6,680*	*3,210*
	North Oak Creek	*1*	*5,220*	*2,510*
		2	*5,140*	*2,470*
	Pulliam	*8*	*7,510*	*3,600*
	South Oak Creek	*5*	*9,670*	*4,640*
		6	*12,000*	*5,780*
		7	*16,200*	*7,770*
		8	*15,800*	*7,580*

PHASE II SULFUR DIOXIDE REQUIREMENTS

SEC. 405. (a). APPLICABILITY.—After January 1, 2000, each steam-electric existing utility unit as provided below is subject to the limitations or requirements of this section. Each utility unit subject to an annual sulfur dioxide tonnage emission limitation under this section is an affected unit under this title. Each source that in-

cludes one or more affected units is an affected source. In the case of an existing unit that was not in operation during calendar year 1985, the emission rate for a calendar year after 1985, as determined by the Administrator, shall be used in lieu of the 1985 rate. The owner or operator of any unit in violation of this section shall be liable for fulfilling the obligations specified in section 411 of this title.

(b) UNITS EQUAL TO, OR ABOVE, 75 MWE AND 1.20 LBS/MMBTU.—After January 1, 2000, it shall be unlawful for any steam-electric existing unit with nameplate capacity equal to, or greater than, 75 MWe and an actual 1985 emission rate equal to or greater than 1.20 lbs/mmBtu to exceed an annual sulfur dioxide tonnage emission limitation equal to the product of the unit's baseline multiplied by an emission rate equal to 1.20 lbs/mmBtu, divided by 2,000 unless the owner or operator of such unit has obtained allowances equal to the emissions in excess of those permitted under this subsection. In the case of a unit which has decreased its emissions rate as of the date of enactment by forty per centum or greater from 1980, and whose utility system's residential customer growth has increased by at least three per centum per year since 1980, such unit has the option of calculating its baseline, as defined in section 402(d)(1), using an average of any three consecutive years between 1980 and 1989.

(c) COAL OR OIL-FIRED UNITS BELOW 75 MWE AND ABOVE 1.20 LBS/MMBTU.—After January 1, 2000, it shall be unlawful for any coal or oil-fired steam-electric existing utility unit with nameplate capacity less than 75 MWe and an actual 1985 emission rate equal to or greater than 1.20 lbs/mmBtu to exceed an annual sulfur dioxide emission rate limitation equal to its actual 1985 emission rate.

(d) COAL-FIRED UNITS BELOW 1.20 LBS/MMBTU.—After January 1, 2000, it shall be unlawful for any coal-fired utility unit with an actual 1985 sulfur dioxide emission rate less than 1.20 lbs/mmBtu to exceed an annual sulfur dioxide tonnage emission limitation equal to the product of the unit's baseline multiplied by a factor of 120 per centum and its actual 1985 emission rate, divided by 2,000. unless the owner or operator of such unit has obtained allowances equal to the emissions in excess of those permitted under this subsection. For the purposes of this section, in the case of an oil and gas-fired unit which has been awarded a clean coal technology demonstration grant as of January 1, 1991, by the United States Department of Energy, such unit may use any three consecutive years between 1980 and 1989 in calculating its baseline, as defined in section 402(d)(1).

(e) OIL AND GAS-FIRED UNITS EQUAL TO OR GREATER THAN 0.4 LBS/MMBTU AND LESS THAN 1.20 LBS/MMBTU.—After January 1, 2000, it shall be unlawful for any oil and gas-fired utility unit with an actual 1985 sulfur dioxide emission rate equal to or greater than 0.4 lbs/mmBtu, but less than 1.20 lbs/mmBtu to exceed an annual tonnage sulfur dioxide emission limitation equal to the product of the unit's baseline multiplied by a factor of 120 per centum and its actual 1985 sulphur dioxide emission rate, divided by 2,000 unless the owner or operator of such unit has obtained allowances equal to the emissions in excess of those permitted under this subsection.

(f) Oil and Gas-fired Units Less Than 0.4 lbs/mmBtu.—After January 1, 2000, it shall be unlawful for any oil and gas-fired unit with an actual 1985 sulphur dioxide emission rate less than 0.4 lbs/mmBtu that consumes annually, on a Btu basis, 90 per centum or less of its fuel in the form of natural gas to exceed an annual sulfur dioxide tonnage emission limitation equal to the product of the unit's baseline multiplied by a factor of 120 per centum and its federally approved emission limitation, divided by 2,000 unless the owner or operator of such unit has obtained allowances equal to the emissions in excess of those permitted under this subsection. .

(g) Units That Commence Operation Between 1985 and the Date of Enactment.—After January 1, 2000, it shall be unlawful for any unit that commences operation on or after January 1, 1985, but not later than the date of enactment of the Clean Air Act Amendments of 1989 to exceed an annual sulfur dioxide tonnage emission limitation equal to the product of the unit's annual fuel consumption, on a Btu basis, at a 65 per centum capacity factor multiplied by the emission rate specified in its permit or other federally enforceable sulfur dioxide emission limitation, divided by 2,000 unless the owner or operator of such unit has obtained allowances equal to the emissions in excess of those permitted under this subsection. .

(h) Oil and Gas-fired Units Less Than 10 Per Centum Oil Consumed.—After January 1, 2000, it shall be unlawful for any oil- and gas-fired utility unit that consumes annually, on a Btu basis, more than 90 per centum of its fuel in the form of natural gas to exceed an emission rate limitation equal to its actual 1985 sulfur dioxide emission rate. In any year that the supply of natural gas is curtailed to any such unit, the owner or operator may apply to the Administrator for allowances equal to the difference between the unit's actual 1985 emission rate multiplied by its baseline and actual emissions during the year including the period of curtailment. The Administrator shall issue allowances to any qualifying source, as provided in section 403(a)(2), as necessary to meet the requirements of this subsection.

CREDITS FOR CLEAN STATES

Sec. 406. (a) Credits.—Existing units in States in which less than one hundred fifty thousand tons of sulfur dioxide were emitted by utility steam-electric generating units in 1985 and in which more than 50 per centum of the coal-fired utility-generated electricity was produced in calendar year 1988 from boilers with a technological system of continuous emissions control shall not be considered affected units for purposes of sections 404 and 405.

(b) After 2000.—After January 1, 2000, it shall be unlawful for each existing unit in States described in subsection (a) to emit sulfur dioxide in excess of its annual average emissions of sulfur dioxide during calendar years 1996, 1997 and 1998. The owner or operator of any unit in violation of this subsection shall be liable for fulfilling the obligations specified in section 411 of this title.

NITROGEN OXIDES EMISSION REDUCTION PROGRAM

SEC. 407. (a) APPLICABILITY.—Emission limitations for nitrogen oxides shall apply to coal-fired affected utility units as defined under sections 404, 405, and 406. Such units are affected units for the purposes of this section.

(b) EMISSION LIMITATIONS.—After January 1, 2000, it shall be unlawful for any affected source that includes one or more affected units to emit nitrogen oxides in excess of the emissions tonnage limitation provided by this section unless the owner or operator of such source has obtained allowances equal to the emissions in excess of those permitted under this subsection. Such limitation is the annual nitrogen oxides limitation that is the product of each unit's baseline multiplied by the following emission rate divided by 2,000—

(1) for tangentially-fired boilers, 0.45 lbs/mmBtu; or

(2) for dry bottom wall-fired boilers, 0.50 lbs/mmBtu.

(3) for all other boiler-types, including, but not limited to cyclone, wet bottom, and stoker boilers, their actual annual average nitrogen oxides emission rate as recorded for those units in 1995 and 1996 based on continuous emission monitoring system data required under section 412, or such lower rate as may be specified for such units by the Administrator if the Administrator determines that nonrepresentative operating conditions have resulted in elevated actual rates for such boiler types.

(c) REVISED PERFORMANCE STANDARD.—(1) Not later than January 1, 1993, the Administrator shall propose revised standards of performance pursuant to section 111 for emissions of nitrogen oxides from fossil fuel fired steam generating units, including both electric utility and nonutility units. Not later than January 1, 1994, the Administrator shall promulgate such revised standards of performance. Such revised standards of performance shall reflect improvements in methods for the reduction of emissions of oxides of nitrogen.

(2) Not later than January 1, 1993, the Administrator shall propose standards of performance pursuant to section 111 for emissions of oxides of nitrogen from large stationary diesel and turbine engines. Not later than January 1, 1994, the Administrator shall promulgate such standards of performance.

PERMITS AND COMPLIANCE PLANS

SEC. 408. (a) PERMIT PROGRAM.—This title shall be implemented by permits issued in accordance with the provisions of this Act. Any permit issued by the Administrator, or a State with an approved permit program, shall prohibit each of the following:

"(1) annual emissions of sulfur dioxide or nitrogen oxides in excess of the total allowances held by the affected unit or source,

"(2) exceedances of applicable sulfur dioxide or nitrogen oxide emissions rates, and

"(3) contravention of any other provision of the permit.

(b) COMPLIANCE PLAN.—Each permit application shall be accompanied by a compliance plan for the source to comply with its requirements under this title. The compliance plan shall provide all necessary information on the schedule and means by which the

source will obtain compliance with its annual tonnage limitation, or emission rate if applicable, including specification of the owner's or operator's intent to acquire any additional allowances beyond the initial allocation that will be used to achieve compliance and the owner or operator's certification that such owner or operator will comply with the requirements of this title in all circumstances, including, but not limited to, those in which such owner or operator fails to secure any such additional allowances necessary to achieve compliance. The Administrator may also require—

(1) for a source, a demonstration of attainment of national ambient air quality standards, and

(2) from the owner or operator of two or more affected sources, an integrated compliance plan providing an overall plan for achieving compliance at the affected sources.

(c) First Phase Permits.—The Administrator shall issue permits to the affected sources under section 404—

(1)(A) Not later than thirty months after the date of enactment of the Clean Air Act Amendments of 1989, the owner or operator of each affected source under section 404 shall submit a permit application and compliance plan for that source in accordance with regulations issued by the Administrator. The permit application and the compliance plan shall be binding on the owner or operator, and be enforceable for purposes of this Act, in lieu of a permit, until a permit is issued by the Administrator for the source pursuant to this section and title III of this Act. During pendency of the permit application and the compliance plan, the owners or operators may amend such applications or plans automatically provided that they notify the Administrator of such amendments.

(B) In the case of a compliance plan for an affected source under section 404 for which the owner or operator proposes to meet the requirements of that section by reducing utilization of the unit by 20 per centum or more, as compared with the baseline prescribed in section 402(d), or by shutting down the unit, the owner or operator shall include in the compliance plan a specification of the units that will provide electrical generation to compensate for the reduced output of the affected source or a demonstration that such reduced utilization will be accomplished through energy conservation or improved unit efficiency. The source, and any unit to be used for such compensating generation, if not otherwise affected under section 404, shall be deemed affected under section 404, subject to the requirements of section 404 of this title, except that allowances shall be allocated to such unit in the amount of an annual limitation equal to the product of the unit's baseline multiplied by the unit's actual 1985 emission rate, divided by 2,000.

(2) The Administrator shall review each proposed compliance plan to determine whether it satisfies the requirements of this title, and shall approve or disapprove such plan within six months after receipt of a complete submission.

(3) Not later than eighteen months after enactment of the Clean Air Act Amendments of 1989, the Administrator shall promulgate regulations consistent with regulations required to be promulgated under title III of this Act to implement a Feder-

al permit program to issue permits for affected sources under this title. Following promulgation, the Administrator shall issue a permit to implement the requirements of section 404 and the allowances provided under section 403 to the owner or operator of each affected source under that section. Such a permit shall supersede any permit application and compliance plan submitted under paragraph (1). The permitting authority shall issue a permit to the affected source in accordance with title III.

(d)(1) SECOND PHASE PERMITS.—To implement sections 405, 406, and 407, each State in which one or more sources subject to those sections are located, shall submit a permit program to the Administrator for approval. The Administrator shall approve any permit program meeting the requirements of section 351.

(2) The owner or operator of each affected source under section 405 shall submit a permit application and compliance plan for that source to the permitting authority, not later than January 1, 1994.

(3) Not later than July 1, 1995, each State with an approved permit program pursuant to title III of this Act shall issue permits to the owners or operators of existing affected sources under section 405 that satisfy the requirements of this Act. In the case of a State without an approved permit program, or a State that fails to issue permits to all of its existing affected sources by July 1, 1995, the Administrator shall, not later than July 1, 1996, issue a permit to the owner or operator of each such affected source that has not been issued a State permit.

(4) Not later than July 1, 1996, the Administrator shall issue allowances to each affected source. These shall be deemed a part of the permit issued for that source, as provided in section 403. Allowances shall be issued each year by the Administrator to affected sources in accordance with sections 403 and 411.

(5) The owner or operator of any unit subject to the requirements of section 407 shall submit a permit application for such unit to the permitting authority, not later than January 1, 1997. The Administrator shall, not later than July 1, 1998, issue a permit to the owner or operator of each such affected source that has not been issued a State permit. The permitting authority shall issue a permit to the owner or operator that satisfies the requirements of this title, including any appropriate monitoring and reporting requirements.

(6) The owner or operators of any unit subject to the requirements of section 406 shall submit a permit application for such unit to the permitting authority not later than July 1, 1999. The permitting authority shall issue a permit to the owner or operator that satisfies the requirements of this title, including any appropriate monitoring and reporting requirements.

(e) NEW UNIT PERMITS.—(1) Each State shall submit a comprehensive and enforceable permit program for new units to the Administrator for approval, as provided under title III. The Administrator shall approve or disapprove complete submittals within one year of receipt.

(2) The owner or operator of each source that includes a new unit or units shall submit a permit application and compliance plan to the permitting authority not later than twenty-four months prior to January 1, 2000, or to commencing operation of the unit, whichever

is later. The permitting authority shall issue a permit to the owner or operator of the unit that satisfies the requirements of this title.

(f) Amendment of Application and Compliance Plan.*—At any time after the submission of an application and compliance plan under this section, the applicant may submit a revised application and compliance plan, in accordance with the requirements of this section.*

(g) Prohibition.*—It shall be unlawful for an owner or operator (1) to fail to submit a permit application or compliance plan in accordance with the deadlines specified in this section or otherwise to fail to comply with regulations implementing this section, or (2) to operate any source subject to this title except in compliance with the terms and requirements of a permit application and compliance plan or permit issued by the Administrator or a State with an approved permit program.*

REPOWERED SOURCES

Sec. 409. (a) Availability.*—Not later than December 31, 1997, the owner or operator of an existing unit subject to the requirements of section 405 may demonstrate to the permitting authority that one or more units will be repowered with a qualifying clean coal technology to comply with the requirements under section 405. The owner or operator shall, as part of any such demonstration, provide, not later than January 1, 2000, satisfactory documentation of a preliminary design and engineering effort for such repowering and an executed contract for the majority of the equipment to repower such unit and such other information as the Administrator may require by regulation.*

(b) Extension.*—An owner or operator satisfying the requirements of subsection (a) shall be granted an extension of the emission limitation requirement compliance date for that unit from January 1, 2000, to December 31, 2003. The extension shall be specified in the permit issued to the source under section 408, together with any compliance schedule and other requirements necessary to meet second phase requirements by the extended date. Any unit that is granted an extension under this section shall not be eligible for a waiver under section 111(j) of this Act.*

(c) Allowances.*—(1) For the period of the extension under this section, the Administrator shall issue to the owner or operator of the affected unit, annual allowances for sulfur dioxide equal to the affected unit's baseline multiplied by the lesser of the unit's federally approved State Implementation Plan limitation or its actual emission rate for 1995. Such allowances may not be transferred or used by any other source to meet emission requirements under this title. The source owner or operator shall notify the Administrator sixty days in advance of the date on which the affected unit for which the extension has been granted is to be removed from operation to install the repowering technology.*

(2) Effective on that date, the source shall be subject to the requirements of section 405. Allowances for the year in which the source is removed from operation to install the repowering technology shall be calculated by multiplying 1.20 lbs/mmBtu by the exist-

ing utility unit, divided by 2,000, and prorated accordingly, and are transferable.

(3) Allowances for such existing utility units for calendar years after the year the repowering is complete shall be calculated by multiplying 1.20 lb./mmBtu of sulfur dioxide by the existing utility unit's baseline divided by 2,000.

(e) PROHIBITION.—It shall be unlawful for the owner or operator of a repowered source to fail to comply with the requirement of this section, and any regulations to implement this section.

ELECTION FOR ADDITIONAL SOURCES

SEC. 410. (a) APPLICABILITY.—The owner or operator of any existing unit that is not an affected unit or that is subject to section 405 (c) or (h) or that is a process source under subsection (e), that emits sulfur dioxide or nitrogen oxides, may elect to designate that unit, or source, to become an affected unit and receive allowances under this title. An election may be submitted to the Administrator for approval anytime after promulgation of regulations under subsection (g) of this section. The Administrator shall approve a designation that meets the requirements of this section and such designated unit, or source, shall receive allowances for purposes of this title, and be an affected unit or source.

(b) ESTABLISHMENT OF BASELINE.—The baseline for a unit designated under this section shall be established by the Administrator by regulation, based on fuel consumption and operating data for the unit for calendar years 1985, 1986, and 1987, or if such data is not available, the Administrator may prescribe a baseline based on alternative representative data.

(c) EMISSION LIMITATIONS.—Annual emission limitations for sulfur dioxide and nitrogen oxides shall be equal to the product of the baseline multiplied by the lesser of the unit's 1985 actual or allowable emission rate in lbs/mmBtu, or, if the unit did not operate in 1985 the emission rate for a calendar year after 1985 (as determined by the Administrator), divided by 2,000. After January 1, 2,000, the emission rate for calculating an emission limitation under this subsection shall be the rate prescribed under section 405 for any unit subject to those provisions. However, any such unit shall be subject only to an emission limitation under this section, and not also to an emission rate requirement under those provisions.

(d) ALLOWANCES AND PERMITS.—The Administrator shall issue allowances to an affected unit, or source, under this section in an amount equal to the limitation calculated under subsection (c) or (e), in accordance with section 403. Such allowances may be transferred to the owner or operator of any other affected source in accordance with section 403.

(e) PROCESS SOURCES.—The Administrator shall establish a program under which the owner or operator of a process source that emits sulfur dioxide or nitrogen oxide may elect to designate that source to receive allowances under this title for designation of process sources as affected sources under this section. The Administrator shall define the sources that may be included (not including any unit as defined under this title), specify the operating, emission baseline, and other data requirements, prescribe CEMS or other

monitoring requirements, and promulgate permit, reporting, and any other requirements necessary to implement such a program.

(f) LIMITATION.—*Any unit designated under this section shall not transfer or bank allowances produced as a result of reduced utilization or shutdown. In no case may the Administrator permit a source to receive allowances in an amount greater than the emissions resulting from operation of the source in full compliance with the requirements of this Act in effect prior to enactment of this title.*

(g) IMPLEMENTATION.—*The Administrator shall issue regulations to implement this section not later than eighteen months after enactment of the Clean Air Act Amendments of 1989.*

EXCESS EMISSIONS FEE

SEC. *411. (a)* EXCESS EMISSIONS FEE.—*The owner or operator of any unit or process source subject to the requirements of sections 403(e), 404, 405, 406, or 407 or designated under section 410 that emits sulfur dioxide or nitrogen oxides for any calendar year in excess of the unit's or process source's emissions limitation requirement or of the allowances the owner or operator possesses for the unit or process source for that calendar year that are unclaimed or unused by any other source shall be liable for the payment of an excess emission fee. That fee shall be calculated on the basis of the number of tons emitted in excess of the unit's or process source's emissions limitation requirement or of the allowances the owner or operator possesses for the unit or process source multiplied by $2,000. Any such fee shall be due and payable without demand to the Administrator as provided in regulations issued by the Administrator. Any such funds shall be deposited in the United States Treasury pursuant to the Miscellaneous Receipts Act. Any fee due and payable under this section shall not diminish any fine, penalty or fee imposed on the same source under any other section of this Act.*

(b) EXCESS EMISSIONS OFFSET.—*The owner or operator of any affected source liable for payment of a fee under subsection (a) is also liable to offset the excess emissions by an equal tonnage amount in the following calendar year, or such longer period as the Administrator may prescribe. The owner or operator of the source shall, within sixty days after the end of the year, submit to the Administrator, and the State, a plan to achieve the required offsets. The Administrator shall also deduct allowances equal to the excess tonnage from those issued for the source for the calendar year, or succeeding years, following the year in which the excess emissions occurred.*

(c) FEE ADJUSTMENT.—*The Administrator shall, by regulation, adjust the fee specified in subsection (a) for inflation, based on the Consumer Price Index, on the date of enactment and annually thereafter.*

(d) PROHIBITION.—*It shall be unlawful for the owner or operator of any source liable for a fee and offset under this section to fail to pay the fee under subsection (a) or to provide, and thereafter comply with, a compliance plan as required by subsection (b), or offset excess emissions as required by subsection (b).*

MONITORING, REPORTING, AND RECORDKEEPING REQUIREMENTS

SEC. 412. (a) APPLICABILITY.—All sources subject to this title shall be required to install and operate continuous emissions monitoring and quality assure the data for sulfur dioxide, nitrogen oxides, opacity and volumetric flow for each unit subject to this title. The Administrator shall, by regulations issued not later than eighteen months after enactment of the Clean Air Act Amendments of 1989, specify the requirements for continuous emissions monitoring, for alternative methods that provide information with the same precision, reliability, accessibility, and timeliness as that provided by continuous emissions monitoring, and for recordkeeping and reporting of information from such systems.

(b) FIRST PHASE REQUIREMENTS.—Not later than thirty-six months after enactment of the Clean Air Act Amendments of 1989, the owner or operator of each affected unit under section 404 shall install and operate continuous emissions monitoring, quality assure the data, and keep records and reports in accordance with regulations issued under subsection (a).

(c) SECOND PHASE REQUIREMENTS.—Not later than January 1, 1995, the owner or operator of each source subject to this title that has not previously met the requirements of subsection (a) shall comply with those requirements.

(d) UNAVAILABILITY OF CONTINUING EMISSIONS MONITORING SYSTEM.—If continuous emissions monitoring data is not available for any affected unit during any period of a calendar year in which such data is required under this title, and the owner or operator cannot provide information, satisfactory to the Administrator, on emissions during that period, the Administrator shall deem the unit to be operating in an uncontrolled manner and, by regulation, prescribe means to calculate emissions for that period. The owner or operator shall be liable for excess emissions fees and offsets under section 411 in accordance with such regulations which shall be issued not later than eighteen months after enactment of the Clean Air Act Amendments of 1989.

(e) PROHIBITION.—It shall be unlawful for the owner or operator of any source subject to this title to operate a source without complying with the requirements of this section, and any regulations implementing this section.

GENERAL COMPLIANCE WITH OTHER PROVISIONS

SEC. 413. Except as expressly provided, compliance with the requirements of this title shall not exempt or exclude the owner or operator of any source subject to this title from compliance with any other applicable requirements of this Act.

ENFORCEMENT

SEC. 414. A violation by the owner or operator of a source subject to this title of the prohibitions of, requirements of, or regulations promulgated pursuant to this title shall be a violation of this Act. Operation of an affected source to emit sulfur dioxide or nitrogen oxides in excess of its allowances shall be deemed a violation, with each ton emitted in excess of allowances held constituting a separate violation.

TITLE V—THE STRATOSPHERIC OZONE AND CLIMATE PROTECTION ACT

FINDINGS

Sec. 501. The Congress finds that—

(1) the best available scientific evidence shows that manufactured substances, including chlorofluorocarbons and other substances covered by this title, are destroying stratospheric ozone, and significantly contributing to global climate change by enhancing the greenhouse effect and causing other atmospheric modifications;

(2) no level of stratospheric ozone depletion or global climate change caused by human activities can be deemed safe;

(3) stratospheric ozone depletion will lead to increased incidence of solar ultraviolet radiation in the troposphere and at the surface of the Earth;

(4) increased incidence of solar ultraviolet radiation will cause increased rates of disease in humans (including increased rates of skin cancer, cataracts, and, potentially, suppression of the immune system), threaten food crops and marine resources, and otherwise damage the natural environment;

(5) the Ozone Trends Report completed in March 1988 through the effort of over one hundred international scientists found undisputed observational evidence that the atmospheric concentrations of source gases important in controlling stratospheric ozone levels and aggravating the problem of uncontrolled global climate change (chlorofluorocarbons, halons, methane, nitrous oxide, and carbon dioxide) are increasing on a global scale as a result of human activities;

(6) scientific expeditions and analyses have established that chlorine compounds derived from emissions of chlorofluorocarbons are responsible for destruction of the stratospheric ozone layer over the Antarctic and the surrounding oceans;

(7) recent scientific reports indicate that a similar destruction of the ozone layer may occur over the Arctic region and that the same chlorine compounds found in the Antarctic region are present in areas of the Arctic ozone layer;

(8) experimental laboratory studies and measurements of ozone depletion suggest that the chemical reactions responsible for destruction of ozone over Antarctica could operate in the aerosol layer of the stratosphere and would not be limited to the polar regions;

(9) the Montreal Protocol on Substances that Deplete the Ozone Layer (the Montreal Protocol) provides a framework for all nations of the world to protect the Earth's ozone shield;

(10) the control measures that are set forth in the Montreal Protocol (a freeze on the consumption of certain chlorofluorocarbons at 1986 levels in 1989 followed by a 20 per centum reduction in 1993 and an additional 30 per centum reduction in 1998, coupled with a freeze on the consumption of certain halons at 1986 levels in 1992) will allow atmospheric concentrations of chlorine to increase by at least a factor of two to three;

(11) because of the worldwide recognition of the need to reduce significantly the use of ozone-depleting chemicals, United States chemical producers and chlorofluorocarbon and halon user industries should be encouraged to develop improved chemicals, products, and technologies that do not rely on chlorofluorocarbons and halons;

(12) the Ozone Trends Report and other recent scientific studies have raised serious questions about the adequacy of the control measures that are set forth in the Montreal Protocol;

(13) ozone depleting chlorofluorocarbons are also powerful greenhouse gases projected to be responsible for 15 to 25 per centum of global warming and, under the existing Montreal Protocol, 10 per centum of future warming;

(14) stratospheric ozone depletion and global climate change from continued emissions of chlorofluorocarbons and other halogenated chlorine containing halocarbons with ozone depleting potential, and emissions of other gases, such as methane and carbon dioxide, imperil human health and the environment worldwide;

(15) in order to stabilize and eventually reduce concentrations of chlorine and bromine in the stratosphere, to conserve the stratospheric ozone layer (an exhaustible natural resource), and to reduce the extent of global climate change—

(A) emissions of chlorofluorocarbons and other substances covered by this title, including partially halogenated chlorine containing halocarbons with ozone depleting potential, should be terminated rapidly;

(B) it is necessary to control international trade in substances covered by this title and products containing such substances; and

(C) emissions of other gases, such as methane and carbon dioxide, should be controlled;

(16) the highest priority must be given to developing and deploying safe and energy efficient products and technologies as substitutes for ozone depleting substances as rapidly as possible; and

(17) the United States needs to develop and deploy safe, energy efficient substitutes to replace ozone depleting substances in order to demonstrate to the world its commitment to protect the stratosphere and to limit global climate change.

OBJECTIVES AND NATIONAL GOAL

SEC. 502. (a) The objectives of this title are to restore and maintain the chemical and physical integrity of the Earth's atmosphere, to protect human health and the global environment from all known and potential dangers due to atmospheric or climatic modification, including stratospheric ozone depletion, to provide for a smooth transition from the use of ozone-depleting chemicals to the use of safe chemicals, products, and technologies that do not threaten the ozone layer, and to reduce the generation of greenhouse gases in order to protect the Earth's ozone layer and to limit anthropogenically induced global climate changes by—

(1) reducing significantly the production and emission into the atmosphere of pollutants caused by human activities,

(2) promoting the rapid development and deployment of energy efficient alternatives to the use of chlorofluorocarbons and other substances covered by this title,

(3) assuring that such alternatives reduce ozone depleting potential to the maximum extent possible and, at the same time, do not exacerbate the problem of human induced global climate change either directly as radiatively important trace gases or indirectly as substances that reduce the energy efficiency of products which incorporate or use such substances, and

(4) promoting additional scientific research on atmospheric or climatic modification, including stratospheric ozone depletion, and on the known and potential adverse effects therefrom on human health and the global environment.

(b) In order to achieve the objectives of this title, it is the national goal to eliminate atmospheric emissions of manufactured substances with ozone depleting potential as well as direct and indirect global warming potential, including chlorofluorocarbons and other halogenated chlorine or bromine containing halocarbons with ozone depleting and global warming potential, to reduce to the maximum extent possible emissions of other gases caused by human activities that are likely to affect adversely the global climate, and to provide for an orderly and equitable shift to alternative, safe chemicals, products, and technologies.

DEFINITIONS

SEC. 503. As used in this title, the term—

(1) "Administrator" means the Administrator of the Environmental Protection Agency;

(2) "household appliances" means noncommercial personal effects, including air-conditioners, refrigerators, and motor vehicles;

(3) "import" means to land on, bring into, or introduce into, or attempt to land on, bring into, or introduce into, any place subject to the jurisdiction of the United States, whether or not such landing, bringing, or introduction constitutes an importation within the meaning of the customs laws of the United States;

(4) "manufactured substances" means any organic or inorganic chemical substances of a particular molecular identity, or any mixture, that has been manufactured for commercial purposes;

(5) "medical purposes" means medical devices and diagnostic products (including drugs, as defined in the Federal Food, Drug, and Cosmetic Act (21 U.S.C. 321)) and drug delivery systems (A) for which no safe and effective substitute has been developed and, where necessary, approved by the Commissioner of the Food and Drug Administration (the Commissioner) and (B) which, after notice and opportunity for public comment, has been approved and determined to be essential by the Commissioner in consultation with the Administrator;

(6) "person" means an individual, corporation (including a government corporation), partnership, firm, joint stock company, trust, association, or any other entity, or any officer, employee, agent, department, or instrumentality of the Federal Government, of any State or political subdivision thereof (including any interstate body), or of any foreign government (including any international instrumentality);

(7) "to produce" means to manufacture a substance from any raw material or feedstock chemical but does not include the manufacture of substances that are used and entirely consumed in the manufacture of other chemicals; and

(8) "substances covered by this title" means those substances which are known or may reasonably be anticipated to cause or contribute to atmospheric or climatic modification, including stratospheric ozone depletion, and are listed under subsections (a) or (b) of section 504 of this title.

PART A—CONTROL OF CHLOROFLUOROCARBONS AND OTHER MANUFACTURED SUBSTANCES

LISTING OF REGULATED SUBSTANCES

SEC. 504. (a) PRIORITY LIST AND INITIAL LISTS OF SUBSTANCES TO BE PHASED-OUT.—Within sixty days after enactment of this title, the Administrator shall publish a priority list of manufactured substances which are known or may reasonably be anticipated to cause or contribute significantly to atmospheric or climatic modification, including stratospheric ozone depletion. The initial list shall include all fully halogenated chlorine or bromine containing halocarbons, including chlorofluorocarbon-11, chlorofluorocarbon-12, chlorofluorocarbon-113, chlorofluorocarbon-114, chlorofluorocarbon-115, carbon tetrachloride, halon-1211, halon-1301, and halon-2402.

(b) OTHER REGULATED SUBSTANCES.—Simultaneously with publication of the priority list, the Administrator shall create a list of other manufactured substances which, in the judgment of the Administrator, are known or may reasonably be anticipated to cause or contribute to atmospheric or climatic modification, including stratospheric ozone depletion. The list of other substances shall be subject to the limitations on production and use under section 508 of this title and shall include all partially halogenated chlorine containing halocarbons not listed under subsection (a), including hydrochlorofluorocarbon-22, hydrochlorofluorocarbon-123, hydrochlorofluorocarbon-124, hydrochlorofluorocarbon-141(b), hydrochlorofluorocarbon-142(b), and methyl chloroform. At least annually thereafter, the Administrator shall publish a proposal to add to the priority list under subsection (a) or the list under this subsection other manufactured substances which, in the judgment of the Administrator, meet the criteria set forth in the first sentence of subsection (a) or this section and warrant listing under subsection (a) or under this subsection. Within one hundred and eighty days of any such proposal, after allowing an opportunity for public comment, the Administrator shall promulgate a regulation adding each such substance to the appropriate list, unless the Administrator determines that such substance clearly does not meet the criteria set forth in the first sentence of subsection (a) or this subsection.

(c) Ozone Depletion Potential, Global Warming Potential, and Atmospheric Lifetime.—Simultaneously with publication of the lists or additions thereto under this section, and at least annually thereafter, the Administrator shall assign to each listed substance numerical values representing the ozone depletion potential of such substance, on a mass (per kilogram) basis, as compared with chlorofluorocarbon-11, the chlorine or bromine contribution of such substance, the global warming potential of such substance, and the atmospheric lifetime of such substance. Unless the Administrator promulgates regulations under this subsection setting forth a different value, the following ozone depletion factors shall apply for the following listed substances:

substance	*ozone depletion factor*
chlorofluorocarbon-11	*1.0*
chlorofluorocarbon-12	*1.0*
hydrochlorofluorocarbon-22	*0.05*
chlorofluorocarbon-113	*0.8*
chlorofluorocarbon-114	*1.0*
chlorofluorocarbon-115	*0.6*
hydrochlorofluorocarbon-123	*0.02*
hydrochlorofluorocarbon-124	*0.02*
hydrochlorofluorocarbon-141(b)	*0.1*
hydrochlorofluorocarbon-142(b)	*0.06*
carbon tetrachloride	*1.06*
methyl chloroform	*0.15*
halon-1211	*3.0*
halon-1301	*10.0*
halon-2402	*6.0*

REPORTING REQUIREMENTS

Sec. 505. (a) Priority List.—Unless such information has previously been reported to the Administrator, within ninety days after enactment of this title, each person producing or importing a substance listed pursuant to subsection (a) of section 504 shall file a report with the Administrator setting forth the amount of the substance that was produced or imported by such person during calendar year 1986. Not less than annually thereafter, each such person shall file a report with the Administrator setting forth the production and importation levels of such substance in each successive twelve-month period until such person ceases production or importation of the substance. Each such report shall be signed by a responsible corporate officer.

(b) Other Regulated Substances.—Within ninety days of the date on which a substance is placed on the list under subsection (b) of section 504, each person producing or importing such substance shall file a report with the Administrator setting forth the amount of the substance that was produced or imported by such person during the twelve months preceding the date of listing. Not less than annually thereafter, each such person shall file a report with the Administrator setting forth the production or importation levels of such substance in each successive twelve-month period until such person ceases production or importation of the substance. Each such report shall be signed by a responsible corporate officer.

PRODUCTION PHASE-OUT OF SUBSTANCES ON THE PRIORITY LIST

SEC. 506. (a) NATIONAL POLICY.—The Congress hereby declares it to be the national policy of the United States that the production and use of substances listed under subsection (a) of section 504 are to be reduced and eliminated as expeditiously as possible.

(b) ACCELERATED SCHEDULE.—The Administrator shall promulgate regulations, after notice and opportunity for public comment, which control and reduce production of—

(1) a substance listed under subsection (a) of section 504 more rapidly than the schedule provided under this title; or

(2) a substance listed under subsection (b) of section 504 on a specific schedule not otherwise provided for in this title;

if (A) the Administrator determines that such revised or specific schedule (i) based on the latest assessments of information regarding the harmful effects on the stratosphere or climate which may be associated with a listed substance, may be necessary to protect human health and the environment or (ii) based on the availability of substitutes for a listed substance, is attainable, or (B) the Montreal Protocol is modified to include a schedule to control and reduce production or consumption of any such substance more rapidly than the schedule set forth in subsection (c) of this section or in regulations promulgated in accordance with this subsection. Any person may petition the Administrator to issue such regulations. The Administrator shall issue such regulations within one hundred and eighty days after receipt of any such petition, unless the Administrator determines that such regulations are not necessary and denies the petition. No less often than every eighteen months, the Administrator shall, in response to a petition or otherwise, either publish such regulations or a determination that such regulations are not necessary.

(c) SCHEDULE.—In the absence of regulations promulgated in accordance with subsection (b) establishing earlier dates—

"(1) effective July 1, 1989, it shall be unlawful for any person to produce a substance listed under subsection (a) of section 504 in annual quantities greater than that produced by such person during calendar year 1986;

"(2) effective July 1, 1993, it shall be unlawful for any person to produce a substance listed under subsection (a) of section 504 in annual quantities greater than 80 per centum of that produced by such person during calendar year 1986;

(3) effective July 1, 1998, it shall be unlawful for any person to produce a substance listed under subsection (a) of section 504 in annual quantities greater than 50 per centum of that produced by such person during calendar year 1986; and

(4) effective July 1, 2000, it shall be unlawful for any person to produce any quantity of a substance listed under subsection (a) of section 504 unless such person has, in accordance with subsection (d), received prior authorization to produce such substance.

(d) EXCEPTION FOR MEDICAL PURPOSES.—Notwithstanding the prohibition set forth in subsection (c)(4) or in regulations promulgated in accordance with subsection (b), the Administrator, after notice and opportunity for public comment, shall authorize the production

or importation of limited quantities of a substance listed under subsection (a) of section 504 solely for medical purposes if such authorization is determined by the Commissioner of the Food and Drug Administration, in consultation with the Administrator, to be necessary for medical purposes.

(e) IMPORTATION.—Any person who imports a substance covered by this title shall, for the purposes of this section and section 508 (control of other regulated substances), be deemed to have produced an equivalent amount of such substance on the date of such importation.

PRODUCTION PHASE-OUT EXCEPTION FOR NATIONAL SECURITY

SEC. 507. The President may issue such orders regarding production and use of chlorofluorocarbon-114, halon-1211, halon-1301 and halon-2402, at any specified site or facility as may be necessary to protect the national security interests of the United States if the President finds that adequate substitutes are not available and that the production and use of such substance is necessary to protect such national security interests. Such orders may include, where necessary to protect such interests, an exemption from any requirement contained in this title. The President shall notify the Congress within thirty days of the issuance of an order under this paragraph providing for any such exemption. Such notification shall include a statement of the reasons for the granting of the exemption. An exemption under this paragraph shall be for a specified period which may not exceed one year. Additional exemptions may be granted, each upon the President's issuance of a new order under this paragraph. Each such additional exemption shall be for a specified period which may not exceed one year. No exemption shall be granted under this paragraph due to lack of appropriation unless the President shall have specifically requested such appropriation as a part of the budgetary process and the Congress shall have failed to make available such requested appropriation.

CONTROL OF OTHER REGULATED SUBSTANCES

SEC. 508. [Reserved.]

NATIONAL RECYCLING AND DISPOSAL PROGRAM

SEC. 509. (a) The Administrator shall, not later than July 1, 1991, promulgate regulations establishing standards and requirements regarding the use of substances covered by this title. Such regulations shall include requirements that (1) reduce the use and emission of such substances to the lowest achievable level and (2) maximize the recapture and recycling of such substances. Such regulations may include requirements to use alternative substances (including substances which are not covered by this title) or to minimize use of substances covered by this title.

(b) The Administrator shall promulgate regulations establishing standards and requirements controlling the production or use of any manufactured substance that may, either directly as a radiatively important trace gas or indirectly as a substance that reduces the energy efficiency of products which incorporate or use such sub-

stance, exacerbate the problems of human induced global climate change.

(c) The Administrator shall, before January 1, 1994, promulgate regulations establishing standards and requirements for the safe disposal of substances covered by this title. Such regulations shall include requirements that—

(1) substances covered by this title that are contained in bulk in appliances, machines or other goods (including but not limited to refrigerators and air-conditioners) shall be removed from each such appliance, machine or other good prior to the disposal of such items;

(2) any appliance, machine or other good containing a substance covered by this title in bulk shall not be manufactured or distributed in commerce unless it is equipped with a servicing aperture which will facilitate the recapture of such substance during service and repair of such item; and

(3) any product in which a substance covered by this title is incorporated so as to constitute an inherent element of such product shall be disposed of in a manner that reduces, to the maximum extent practicable, the release of such substance into the environment. If the Administrator determines that the disposal of any product covered by paragraph (3) would result in producing only marginal environmental benefits, the Administrator shall include in such regulations an exception for such product.

(d) Effective January 1, 1992, it shall be unlawful for any person in the course of maintaining, servicing, repairing, or disposing a household appliance or a commercial refrigeration or air-conditioning unit to knowingly vent or otherwise knowingly release or dispose of any substance used as a refrigerant in such appliance or unit and covered by this title in a fashion which permits such substance to enter the environment. De minimis releases associated with good faith attempts to recapture and recycle or safely dispose of any substance covered by this title shall not be covered by the preceding sentence.

MOTOR VEHICLE AIR-CONDITIONING

SEC. 510. (a) CERTIFICATION OF EQUIPMENT.—Within one year after the date of enactment of this title, the Administrator shall issue regulations which provide that on or after January 1, 1992, no person shall perform service for consideration on a motor vehicle air-conditioning system, including maintenance and repair services, unless such person uses equipment which is certified as meeting the standards set by the Society of Automotive Engineers for the extraction and reclamation of a refrigerant from motor vehicle air-conditioning systems by—

(A) the National Institute of Standards and Technology,

(B) the Underwriters Laboratories, or

(C) an entity which the Administrator determines to be comparable to the entities described in subparagraphs (A) or (B).

(b) SCHEDULE FOR ACQUISITION AND USE OF EQUIPMENT AND DOCUMENTATION OF SUCH USE.—(1) Within one year after the date of enactment of this title, the Administrator shall issue regulations es-

tablishing a phased schedule of deadlines by which the equipment described in subsection (a) shall be acquired by entities that perform service for consideration on motor vehicle air-conditioning systems.

(2) In establishing the schedule under paragraph (1), the Administrator shall—

(A) set an earlier deadline for any entity that performs service on a high volume of motor vehicle air-conditioning systems, as determined by the Administrator, and

(B) require all entities that perform service for consideration on motor vehicle air-conditioning systems to have such equipment operational and in use for any such service performed on or after January 1, 1992.

(c) DOCUMENTATION REQUIREMENTS.—Within one year after the date of enactment of this title, the Administrator shall promulgate regulations which require entities described in subsection (b)(1) to document the following on a form provided by the Environmental Protection Agency—

(A) the number of motor vehicle air-conditioning systems repaired or otherwise serviced by such entity;

(B) the amount and type of substances covered by this title that are purchased by such entity; and

(C) the amount and type of substances covered by this title that are sold by such entity.

(d) RESTRICTIONS ON THE SALE OF LISTED SUBSTANCES.—Effective January 1, 1992, it shall be unlawful for any person to sell or offer for sale to any person or entity (other than a person or entity performing service for consideration on motor vehicle air-conditioning systems in compliance with subsection (a) of this section) any substance covered by this title that is suitable for use as a refrigerant in a motor vehicle air-conditioning system and is in a container which contains less than twenty pounds of such refrigerant.

(e) RESTRICTIONS ON THE SALE OF MOTOR VEHICLE AIR-CONDITIONING SYSTEMS THAT USE CHLOROFLUOROCARBONS.—(1) Within two years after enactment of this title, the Administrator shall issue regulations establishing standards and requirements to assure that a minimum percentage of the motor vehicles manufactured in the United States and imported into the United States that are equipped with passenger compartment air-conditioning systems are equipped with systems that are not dependent on chlorofluorocarbon-12 as a refrigerant (or any substitute refrigerant with a comparable ozone depletion factor). Such regulations shall provide that, beginning with model year 1994, not less than 25 per centum of such motor vehicles are so equipped and, beginning with model year 1996, not less than 50 per centum of such motor vehicles are so equipped.

(2) If the Administrator determines that, as a result of technological development problems, the development of alternative systems or products necessary to equip motor vehicle passenger compartments with air-conditioning systems that are not dependent on chlorofluorocarbon-12 as a refrigerant (or any substitute refrigerant with a comparable ozone depletion factor) will not occur within the time necessary to provide for compliance with paragraph (1) of this subsection, the Administrator shall so inform the Congress and propose alternative effective dates for this subsection.

(f) Definition.—As used in this section, the term "motor vehicle" has the meaning given for such term under section 102 of the National Traffic and Motor Vehicle Safety Act of 1966 (15 U.S.C. 1391(3)).

NONESSENTIAL CONSUMER PRODUCTS CONTAINING CHLOROFLUOROCARBONS

Sec. 511. (a) Effective twelve months after the date of enactment of this title, it shall be unlawful for any person to sell or distribute, or offer for sale or distribution, nonessential products that release substances listed under subsection (a) of section 504 into the atmosphere during use, including chlorofluorocarbon-propelled plastic party streamers and noise horns, chlorofluorocarbon-containing cleaning fluids for noncommercial electronic and photographic equipment, and other consumer products determined by the Administrator to be nonessential. Nothing in this section shall apply to products used for medical purposes, as defined in section 503(5) of this Act.

(b) Effective January 1, 1994, it shall be unlawful for any person to sell or distribute, or offer for sale or distribution—

(1) any aerosol product or other pressurized dispenser (other than a medical devise or diagnostic product, including drugs, as defined in the Federal Food, Drug, and Cosmetic Act (21 U.S.C. 321) or a drug delivery system) which contains a substance listed under subsection (b) of section 504; or

(2) any plastic foam product (other than a foam insulation product) which contains or is manufactured with a substance listed under subsection (b) of section 504.

CERTIFICATION OF EQUIVALENT PROGRAMS

Sec. 512. (a) Imports.—Effective twelve months after the date on which a substance is placed on the priority list under subsection (a) of section 504, it shall be unlawful for any person to import such substance or any product containing such substance unless the Administrator, in consultation with the Secretary of State (the Secretary), has published a decision, after notice and opportunity for public comment, certifying that the nations in which such substance or product was manufactured and from which such substance or product is imported are parties to and in compliance with the Montreal Protocol on Substances that Deplete the Ozone Layer. Effective July 1, 2000, it shall be unlawful for any person to import a substance listed under subsection (a) of section 504 or any product containing such substance unless the Administrator, in consultation with the Secretary, has published a decision, after notice and opportunity for public comment, certifying that the nations in which such substance or product was manufactured and from which such substance or product is imported have established and are fully implementing programs that require reduced production of such listed substance, and limit production of other substances covered by this title, on a schedule and in a manner that is at least as stringent as the reduction schedule for, and limitations on, domestic production which apply under this title. The prohibition on the import of any product containing a substance listed under subsection (a) of section

504 shall include, after notice and opportunity for public comment, any product which the Administrator has reason to believe may contain or is designed to contain or use such substance. The Administrator's decision that a product contains or is designed to contain or use such substance shall constitute a rebuttable presumption.

(b) CERTIFICATION OF NATIONAL PROGRAM.—The Administrator shall not certify any national program under the second sentence of subsection (a) unless it is determined that—

(1) the Nation has adopted legislation or regulations which give the reduction schedule for each listed substance the force of law; and

(2) the legislation or regulations include reporting requirements and enforcement provisions no less stringent than those specified in sections 505 and 515 of this title, and that the information contained in such reports is available to the Administrator and the Secretary.

(c) REVOCATION.—At least annually, the Administrator, in consultation with the Secretary, shall review each certification made under this section and shall revoke such certification, after notice and opportunity for public comment, unless it is determined that the applicable conditions of subsections (a) and (b) remain satisfied and that the reduction schedule for each listed substance is in fact being carried out in such nations. Any such revocation shall take effect one hundred and eighty days after notice of the revocation has been published.

(d) INVESTMENT AND EXPORT.—(1) Within one year after enactment of this section, the President shall prohibit—

(A) the export of technologies used to produce a substance listed under subsection (a) of section 504; and

(B) direct or indirect investments by any person in facilities designed for or capable of producing a substance listed under subsection (a) of section 504 in nations not certified under this section.

(2) Not later than January 1, 1992, and every two years thereafter, the President shall, after notice and opportunity for public comment—

(A) determine whether there exists, for each class of products containing a substance listed under subsection (a) of section 504 or manufactured with a process that uses such substance, substitute products or manufacturing processes that do not rely on the use of such substances; and

(B) promulgate regulations for each class of products for which a positive determination has been made under subparagraph (A).

Such regulations shall prohibit direct or indirect investments by any person in facilities designed for or capable of—

(i) using a substance listed under subsection (a) of section 504 in nations not certified under this section in quantities that will increase use of such substance in any such nation, or

(ii) manufacturing products that require the use of a substance listed under subsection (a) of section 504 in nations not certified under this section in quantities that will increase use of such substance in any such nation.

(e) Foreign Aid.—The President shall direct that no agency of the government provide bilateral or multilateral subsidies, aids, credits, guarantees, or insurance programs, for the purpose of producing any substance listed under subsection (a) of section 504.

LABELING

Sec. 513. (a) Not later than January 1, 1992, and every two years thereafter, the Administrator shall, after notice and opportunity for public comment—

(1) determine whether there exists, for each class of products containing a substance listed under subsection (a) of section 504 or manufactured with a process that uses such substance, substitute products or manufacturing processes that do not rely on the use of such substances; and

(2) promulgate regulations for each class of products for which a positive determination has been made under paragraph (1). Such regulations shall prohibit the introduction or reintroduction into interstate commerce of any product containing such substance or manufactured with a process that uses such substance ninety days after promulgation of such regulations unless such product bears a label stating either of the following as appropriate:

(A) "Warning: This product contains (insert name of listed substance) a substance which harms public health and the environment by destroying ozone in the upper atmosphere and by disrupting the climate".

(B) "Warning: This product is manufactured with (insert name of listed substance) a substance which harms public health and the environment by destroying ozone in the upper atmosphere and by disrupting the climate".

(b) The Administrator shall, after notice and opportunity for public comment, promulgate labeling requirements determined by the Administrator to be appropriate for products containing a substance listed under subsection (b) of section 504 or manufactured with a process that uses such substance.

SAFE ALTERNATIVES POLICY

Sec. 514. (a) Policy.—To the maximum extent practicable, substances covered by this title shall be replaced by chemicals, product substitutes, or alternative manufacturing processes that reduce overall risks to human health and the environment.

(b) Reviews and Reports.—The Administrator shall—

(1) recommend Federal research programs and other activities to assist in identifying alternatives to the use of substances covered by this title as refrigerants, solvents, fire retardants, foam blowing agents, and other commercial applications and in achieving a transition to such alternatives;

(2) examine Federal procurement practices with respect to substances covered by this title and recommend measures to promote the transition by the Federal Government, as expeditiously as possible, to the use of safe substitutes; and

(3) specify initiatives, including appropriate intergovernmental, international, and commercial information and technology

transfers, to promote the development and use of safe substitutes for substances covered by this title, including alternative chemicals, product substitutes, and alternative manufacturing processes.

(c) Additional Measures.—Notwithstanding any other provision of law, the Administrator shall require that—

(1) any person who produces a chemical substitute for substances covered by this title shall provide to the Administrator all published and unpublished health and safety studies on such chemical substitute; and

(2) any person who produces a chemical substitute for substances covered by this title shall notify the Administrator of such person's intent to introduce such chemical substitute into commerce not less than sixty days prior to such introduction.

FEDERAL ENFORCEMENT

Sec. 515. (a) Compliance Orders.—(1) Whenever on the basis of any information the Administrator determines that any person has violated or is in violation of any requirement of this title, the Administrator may issue an order assessing a civil penalty for any past or current violation, requiring compliance immediately or within a specified time period, or both, or the Administrator may commence a civil action in the United States district court in the district in which the violation occurred for appropriate relief, including a temporary or permanent injunction.

(2) Any order issued pursuant to this subsection may include a suspension or revocation of any permit issued by the Administrator under this title and shall state with reasonable specificity the nature of the violation. Any penalty assessed in the order shall not exceed $25,000 per day of noncompliance for each violation of a requirement of this title. In assessing such a penalty, the Administrator shall take into account the seriousness of the violation and any good faith efforts to comply with applicable requirements.

(b) Public Hearing.—Any order issued under this section shall become final unless, no later than thirty days after the order is served, the person or persons named therein request a public hearing. Upon such request the Administrator shall promptly conduct a public hearing. In connection with any proceeding under this section the Administrator may issue subpoenas for the attendance and testimony of witnesses and the production of relevant papers, books, and documents, and may promulgate rules for discovery procedures.

(c) Violation of Compliance Orders.—If a violator fails to take corrective action within the time specified in a compliance order, the Administrator may assess a civil penalty of not more than $25,000 for each day of continued noncompliance with the order and the Administrator may suspend or revoke any permit issued to the violator.

(d) Criminal Penalties.—Any person who—

(1) knowingly exceeds the production limits under section 506 (production phase-out for initial list) or section 508 (control of other regulated substances);

(2) knowingly introduces into interstate commerce a substance that was produced in violation of section 506 or section 508;

(3) knowingly imports a substance listed under subsection (a) of section 504, or a product containing such substance, in violation of section 512 (certification of equivalent programs);

(4) knowingly exports technologies or invests in facilities in violation of section 512 (certification of equivalent programs);

(5) knowingly vents or releases a substance into the environment in violation of section 509 (recycling and disposal program);

(6) knowingly introduces into interstate commerce a substance or product in violation of section 509 (recycling and disposal program), section 510 (motor vehicle air-conditioning), section 511 (nonessential consumer products), or section 513 (labeling);

(7) knowingly omits material information or makes any false material statement or representation in any application, record, report, permit, or other document filed, maintained, or used for purposes of compliance with this title; or

(8) knowingly produces, transports, distributes or uses any substance listed under section 504, or a product containing such substance, and who knowingly destroys, alters, conceals, or fails to file any record, application, report, or other document required to be maintained or filed for purposes of compliance with this title

shall, upon conviction, be subject to a fine in accordance with title 18 of the United States Code for each day of a violation, or imprisonment not to exceed two years, or both. If conviction is for a violation committed after a first conviction of such person under this subsection, the maximum punishment shall be doubled with respect to both fine and imprisonment.

(e) CIVIL PENALTY.—Any person who violates any requirement of this title shall be liable to the United States for a civil penalty in an amount not to exceed $25,000 for each such violation.

(f) VIOLATIONS.—Each day of violation of any requirement of this title shall, for purposes of this section, constitute a separate violation. In addition, for purposes of section 506 (production phase-out for initial list) and section 508 (control of other regulated substances), the production, introduction into commerce, or importation of each one hundred pounds of a substance listed under section 504 that is in excess of the production limits under section 506 or section 508 shall constitute a separate violation.

JUDICIAL REVIEW OF FINAL REGULATIONS AND CERTAIN PETITIONS

SEC. 516. Any judicial review of any final action of the Administrator pursuant to this title shall be in accordance with sections 701 through 706 of title 5 of the United States Code, except that—

(1) a petition for review of any final action of the Administrator may be filed by any interested person in the Circuit Court of Appeals of the United States for the Federal judicial district in which such person resides or transacts business, and such petition shall be filed within ninety days from the date of such action or after such date if such petition is for review based solely on grounds arising after such ninetieth day; action of the Administrator with respect to which review could have been ob-

tained under this subsection shall not be subject to judicial review in civil or criminal proceedings for enforcement; and

(2) if a party seeking review under this title applies to the court for leave to adduce additional evidence, and shows to the satisfaction of the court that the information is material and that there were reasonable grounds for the failure to adduce such evidence in the proceeding before the Administrator, the court may order such additional evidence (and evidence in rebuttal thereof) to be taken before the Administrator, and to be adduced upon the hearing in such manner and upon such terms and conditions as the court may deem proper; the Administrator may modify administrative findings as to the facts, or make new findings, by reason of the additional evidence so taken, and shall file with the court such modified or new findings and the Administrator's recommendation, if any, for the modification or setting aside of the original administrative order, with the return of such additional evidence.

CITIZEN SUITS

SEC. 517. (a) IN GENERAL.—Except as provided in subsection (b) or (c) of this section, any person may commence a civil action on his own behalf—

(1) against any person (including (a) the United States, and (b) any other governmental instrumentality or agency, to the extent permitted by the eleventh amendment to the Constitution) who is alleged to have violated or to be in violation of any permit, regulation, condition, requirement, prohibition, or order which has become effective pursuant to this title; or

(2) against the Administrator where there is alleged a failure of the Administrator to perform any act or duty under this title which is not discretionary with the Administrator.

Any action under paragraph (1) of this subsection shall be brought in the district court for the district in which the alleged violation occurred. Any action brought under paragraph (2) of this subsection may be brought in the district court for the district in which the alleged violation occurred or the District Court of the District of Columbia. The district court shall have jurisdiction, without regard to the amount in controversy or the citizenship of the parties, to enforce the permit, regulation, condition, requirement, prohibition, or order, referred to in paragraph (1), to order such person to take such other action as may be necessary, or both, or to order the Administrator to perform the act or duty referred to in paragraph (2), as the case may be, and to apply any appropriate civil penalties under section 515.

(b) ACTIONS PROHIBITED.—No action may be commenced under subsection (a)(1) of this section—

(1) prior to sixty days after the plaintiff has given notice of the violation to—

(A) the Administrator; and

(B) to any alleged violator of such permit, regulation, condition, requirement, prohibition, or order; or

(2) if the Administrator has commenced and is diligently prosecuting a civil or criminal action in a court of the United

States to require compliance with such permit, regulation, condition, requirement, prohibition, or order.

In any action under subsection (a)(1), any person may intervene as a matter of right. Any action respecting a violation under this title may be brought under this section only in the judicial district in which such alleged violation occurred or is occurring.

(c) NOTICE.—No action may be commenced under subsection (a)(2) of this section prior to sixty days after the plaintiff has given notice to the Administrator that said plaintiff will commence such action. Notice under this subsection shall be given in such manner as the Administrator shall prescribe by regulation.

(d) INTERVENTION.—In any action under this section the Administrator, if not a party, may intervene as a matter of right.

(e) COSTS.—The court, in issuing any final order in any action brought pursuant to this section or section 515, may award costs of litigation (including reasonable attorney and expert witness fees) to the prevailing or substantially prevailing party, whenever the court determines such an award is appropriate. The court may, if a temporary restraining order or preliminary injunction is sought, require the filing of a bond or equivalent security in accordance with the Federal Rules of Civil Procedure.

(f) OTHER RIGHTS PRESERVED.—Nothing in this section shall restrict any right which any person (or class of persons) may have under any statute or common law to seek enforcement of any standard or requirement or to seek any other relief (including relief against the Administrator).

SEPARABILITY

SEC. 518. If any provision of this title, or the application of any provision of this title to any person or circumstance is held invalid, the application of such provision to other persons or circumstances and the remainder of this title shall not be affected thereby.

RELATIONSHIP TO OTHER LAWS

SEC. 519. (a) Nothing in this title shall be construed to alter or affect the authority of the Administrator under any other provisions of this Act or the Toxic Substances Control Act or to affect the authority of any other department or agency, or instrumentality of the United States under any provision of law to promulgate or enforce any requirement respecting the control of any substance, practice, process, or activity for purposes of protecting the stratospheric ozone layer or reducing the extent of global climate change.

(b) Nothing in this title shall preclude or deny any State or political subdivision thereof from adopting or enforcing any requirement respecting the control of any substances, practice, process, or activity for purposes of protecting the stratospheric ozone layer or reducing the extent of global climate change except as otherwise provided in subsection (c).

(c) If a regulation of any substance, practice, process, or activity is in effect under this title in order to prevent or abate any risk to the stratosphere, or ozone in the stratosphere, no State or political subdivision thereof may adopt or attempt to enforce any requirement respecting the control of any such substance, practice, process, or activ-

ity to prevent or abate such risk, unless the requirement of the State or political subdivision is identical to the requirement of such regulation. If upon application of any person, after notice and opportunity for public hearing, the Administrator determines that the requirement of a State or political subdivision does not impose a substantial and unreasonable burden on interstate commerce, the Administrator shall waive application of the preceding sentence. No such waiver shall be granted if the Administrator determines that—

(1) the decision of the State or political subdivision is arbitrary and capricious, or

(2) the requirements and accompanying enforcement procedures of such State or political subdivision are inconsistent with the requirements and procedures of this title.

AUTHORITY OF ADMINISTRATOR

SEC. 520. The Administrator is authorized to prescribe such regulations as may be necessary to carry out this title.

GRANTS

SEC. 521. (a) The Administrator is authorized to establish and carry out a grant program through the Office of Air and Radiation for purposes of promoting the objectives of this title by: testing the basic properties of chemical substitutes; examining product redesign and technological innovations that would reduce, avoid, or eliminate chemical use in specific production processes; testing the applicability of possible substitutes in specific products; examining health, environmental, and safety issues related to the use of potential chemical substitutes; developing new technologies; improving the energy efficiency of new or modified technologies; monitoring environmental impacts; conservation; and other related purposes. Grants made under such program may be made to public and private entities, or combinations thereof, including consortia established expressly for the purpose of conducting research and related activities pursuant to this title.

(b) Applications for grants under this title shall be submitted at such time and in such form and contain such information as the Administrator shall prescribe by regulation.

(c) In making grants under this section, the Administrator shall consider, among other factors: the quantities of ozone-depleting chemicals or greenhouse gas emissions the proposed substitute, product or technology would replace; the timing of possible reductions with preference given to substitutes, products and technologies that will yield prompt reductions in demand for ozone-depleting chemicals covered by this title; the global climate implications of a proposed project; the likelihood of commercialization of the technology; the degree of public and private participation and support for a proposed project; the extent to which the results of the project will be accessible to the public; and the energy efficiency that would result from the project.

(d) There are authorized to be appropriated to the Environmental Protection Agency such amounts as may be necessary to carry out the grant program pursuant to this section.

PART B—METHANE ASSESSMENT

OBJECTIVE AND NATIONAL GOAL

SEC. 522. (a) The objective of this part is to identify and analyze options to reduce the risks of tropospheric ozone formation and global climate change by—

(1) reducing global methane emissions sufficiently to assure that the atmospheric concentration of methane does not rise above current levels;

(2) identifying and analyzing the relationships among methane and other atmospheric pollutants to determine the synergies that may be contributing to tropospheric ozone formation and global climate change;

(3) promoting additional analyses of the factors causing methane concentrations to increase and of the sources of methane emissions and the opportunities for reducing such emissions; and

(4) identifying emissions reductions options that are economically as well as environmentally advantageous.

(b) In order to achieve the objective of this part, it is a national goal to—

(1) reduce methane emissions associated with human activities in the United States;

(2) stimulate international agencies to fund projects in developing countries that will reduce methane emissions;

(3) stimulate other governments to implement measures to reduce methane emissions; and

(4) in support of international efforts to reduce methane emissions, provide data regarding sources of methane emissions and options for reducing such emissions.

INFORMATION COLLECTION

SEC. 523. The Administrator is authorized to collect from persons responsible for the release of methane to the atmosphere during manufacturing, processing, resource recovery or distribution, waste management, or other economic activities information concerning such releases as may be necessary to complete the studies required by this part. Failure or refusal to provide such information in such form as the Administrator may reasonably require shall constitute a violation for purposes of section 515 of this title. To the extent information concerning methane releases is already being reported to a State or Federal agency and such information is available to the Administrator, the Administrator shall utilize such sources of information.

ECONOMICALLY JUSTIFIED ACTIONS

SEC. 524. Not later than September 30, 1990, the Administrator shall develop in consultation and coordination with the Administrators of the National Aeronautics and Space Administration and the National Oceanic and Atmospheric Administration, as well as the heads of other relevant Federal agencies and departments, and submit a report to the Congress that identifies activities, substances, processes, or combinations thereof that could reduce methane emis-

sions and are economically justified with or without consideration of environmental benefit.

DOMESTIC METHANE SOURCE INVENTORY AND CONTROL OPTIONS

SEC. 525. (a) Not later than September 30, 1990, the Administrator shall develop in consultation and coordination with the Administrators of the National Aeronautics and Space Administration and the National Oceanic and Atmospheric Administration, as well as the heads of other relevant Federal agencies and departments, and submit to the Congress reports on:

(1) Methane emissions associated with natural gas extraction, transportation, distribution, storage, and use. Such report shall include an inventory of methane emissions associated with such activities within the United States. Such emissions include, but are not limited to, accidental and intentional releases from natural gas and oil wells, pipelines, processing facilities, and gas burners.

(2) Methane emissions associated with coal extraction, transportation, distribution, storage, and use. Such report shall include an inventory of methane emissions associated with such activities within the United States. Such emissions include, but are not limited to, accidental and intentional releases from mining shafts, degasification wells, gas recovery wells and equipment, and from the processing and use of coal.

(3) Methane emissions associated with management of solid waste. Such report shall include an inventory of methane emissions associated with all forms of waste management in the United States, including storage, treatment, and disposal.

(4) Methane emissions associated with agriculture. Such report shall include an inventory of methane emissions associated with rice production and animal production in the United States.

(5) Methane emissions associated with biomass burning. Such report shall include an inventory of methane emissions associated with the intentional burning of agricultural wastes, wood, grasslands and forests.

(6) Other methane emissions associated with human activities. Such report shall identify and inventory other domestic sources of methane emissions that are deemed by the Administrator to be significant.

(b) Not later than September 30, 1990, the Administrator shall develop in consultation and coordination with the Administrators of the National Aeronautics and Space Administration and the National Oceanic and Atmospheric Administration, as well as the heads of other relevant Federal agencies and departments, and submit to the Congress a report that presents a plan outlining measures that could be implemented to stop the growth in atmospheric concentrations of methane from sources within the United States. This plan shall identify and evaluate the technical options for reducing methane emissions from each of the activities listed in subsection (a) as well as other activities or sources deemed by the Administrator to be significant and shall include an evaluation of costs. The plan shall identify the emissions reductions that must be

achieved to prevent increasing atmospheric concentrations of methane. The plan shall also identify programs of the United States and international lending agencies that could be used to induce lesser developed countries to undertake measures that will reduce methane emissions and the resource needs of such programs.

INTERNATIONAL STUDIES

SEC. 526. (a) Not later than September 30, 1990, the Administrator shall develop in consultation and coordination with the Administrator of the National Aeronautics and Space Administration and the National Oceanic and Atmospheric Administration, as well as the heads of other relevant Federal agencies and departments, and submit to the Congress a report on methane emissions from countries other than the United States. Such report shall include inventories of methane emissions associated with the activities listed in subsection (a) of section 525.

(b) Not later than September 30, 1990, the Administrator shall develop in consultation and coordination with the Administrators of the National Aeronautics and Space Administration and the National Oceanic and Atmospheric Administration, as well as the heads of other relevant Federal agencies and departments, and submit to the Congress a report that analyzes the potential for preventing an increase in atmospheric concentrations of methane from activities and sources in other countries. Such report shall identify and evaluate the technical options for reducing methane emissions from each of the activities listed in subsection (a) of section 525 as well as other activities or sources that are deemed by the Administrator to be significant and shall include an evaluation of costs. The report shall identify the emissions reductions that must be achieved to prevent increasing atmospheric concentrations of methane. The report shall also identify technology transfer programs that could promote methane emissions reductions in lesser developed countries.

NATURAL SOURCES

SEC. 527. Not later than September 30, 1992, the Administrator shall develop in consultation and coordination with the Administrators of the National Aeronautics and Space Administration and the National Oceanic and Atmospheric Administration, as well as the heads of other relevant Federal agencies and departments, and submit to Congress reports on—

(1) methane emissions from biogenic sources such as (A) tropical, temperate and subarctic forests, (B) tundra and (C) freshwater and saltwater wetlands; and

(2) the changes in methane emissions from biogenic sources that may occur as a result of predicted increases in temperatures and atmospheric concentrations of carbon dioxide.

TITLE II—SOLID WASTE DISPOSAL

CONTENTS

* * * * * * *

SUBTITLE D—STATE OR REGIONAL SOLID WASTE PLANS

Section:
4001. Objectives of subtitle.
4002. Federal guidelines for plans.
4003. Requirements for approval of plans.
4004. Criteria for sanitary landfills; sanitary landfills required for all disposal.
4005. Upgrading of open dumps.
4006. Procedure for development and implementation of State plan.
4007. Approval of State plan; Federal assistance.
4008. Federal assistance.
4009. Rural communities assistance.
4010. Adequacy of certain guidelines and criteria.
4011. Municipal waste combustion: Ash disposal.

* * * * * * *

Subtitle C—Hazardous Waste Management

IDENTIFICATION AND LISTING OF HAZARDOUS WASTE

SEC. 3001. (a) * * *

* * * * * * *

[(i) CLARIFICATION OF HOUSEHOLD WASTE EXCLUSION.—A resource reovery facility recovering energy from the mass burning of municipal solid waste shall not be deemed to be treating, storing, disposing of, or otherwise managing hazardous waste for the purposes of regulation under this subtitle, if—

[(1) such facility—

[(A) receives and burns only—

[(i) household waste (from single, and multiple dwellings, hotels, motels, and other residential sources) and

[(ii) solid waste from commercial or industrial sources that does not contain hazardous waste identified or listed under this section, and

[(B) does not accept hazardous wastes identified or listed under this section, and

[(2) the owner or operator of such facility has established contractual requirements or other appropriate notification or inspection procedures to assure that hazardous wastes are not received at or burned in such facility.]

* * * * * * *

Subtitle D—State or Regional Solid Waste Plans

* * * * * * *

MUNICIPAL WASTE COMBUSTION DISPOSAL

SEC. 4011. (a) IN GENERAL.—(1) Not later than eighteen months after the date of enactment of this section, the Administrator shall promulgate regulations for the management, handling, storage, treatment, transportation, reuse, recycling, and disposal of ash from municipal waste incineration units, as may be necessary to protect human health and the environment. Notwithstanding other provisions of this Act, the management, handling, storage, treatment, transportation, reuse, recycling, and disposal of ash from municipal *waste incineration units shall be subject to this section and subtitle and not subject to the provisions of subtitle C except that the Administrator may issue regulations under subtitle C in lieu of regulations under this section applicable to ash from units operated primarily to incinerate hospital or other infectious wastes. Until such time as regulations are promulgated for such units, ash from units operated primarily to incinerate hospital or other infectious wastes shall be subject to the requirements of this section. The provisions of sections 3007 and 3008 shall apply to ash from municipal waste incineration units and the requirements of this section to the same extent that such sections apply to hazardous wastes and the requirements of subtitle C.*

(2) For the purposes of this section, the term—

(A) "municipal waste incineration unit" shall have the meaning given in section 130(k)(1) of the Clean Air Act; and

(B) "treatment" means any method, technique, or process designed to change the physical, chemical, or biological character or composition of any ash so as to remove or permanently fix in place any constituent of the ash which, in the event of mismanagement during transportation, storage, reuse or disposal, would pose a threat to human health or the environment and includes testing of such ash to assure that criteria promulgated under subsection (e) are satisfied.

(3) Regulations promulgated under this section may establish requirements that apply to fly ash separately, to bottom ash separately, or to the combination of fly ash and bottom ash.

(b) Disposal.—(1) Regulations promulgated under subsection (a) for the disposal of ash from municipal waste incineration units in landfills shall require—

(A) the installation of a double liner consisting of one flexible membrane liner and a composite liner with a leachate collection system above and between such liners, in accordance with paragraph (2); and

(B) ground water monitoring.

(2) The requirement of paragraph (1)(A) may be satisfied by the installation of liners designed, operated, and constructed of materials to prevent the migration of any constituent into such liners during the period such facility remains in operation (including any post-closure monitoring period). For the purposes of this section the term 'composite liner' means a liner which consists of a flexible membrane liner and at least a three-foot thick layer of recompacted clay or other natural material with a hydraulic conductivity of no more than 1 x 10^{-7} *centimeter per second. The provisions of this paragraph apply prior to and after the promulgation of regulations under paragraph (1).*

(3)(A) Notwithstanding the requirement of paragraph (1)(A), regulations promulgated under subsection (a) may provide for the placement of ash from municipal waste incineration units in a monofill (containing only ash from such units) with a composite liner designed, operated and constructed of materials to prevent the migration of any constituent into and through such liner during the period the monofill remains in operation (including any post-closure monitoring period), ground water monitoring and leachate collection.

(B) For the purpose of paragraph (4), a monofill (containing only ash from municipal waste incineration units) with two or more flexible membrane liners, a leachate collection system above and between such liners and ground water monitoring is determined to be an alternative design which will prevent the migration of any hazardous constituent into ground water or surface water at least as effectively as the design requirements of subparagraph (A).

(C) If fly ash is to be disposed in a monofill containing solely or substantially fly ash, such ash shall be treated pursuant to treatment standards established under this section before disposal or such monofill shall be constructed with an additional liner and a leachate detection and collection system between the liners.

(D) Requirements under this paragraph are minimum requirements and the Administrator shall promulgate more stringent requirements applicable where necessary to assure that releases from a monofill will not contaminate ground water or surface water or otherwise pose a threat of adverse effects on human health or the environment.

(4) The design requirements of paragraphs (1) and (3) shall not apply if the owner or operator of a solid waste management unit utilizing an alternative design demonstrates to the State, and the State finds, that the alternative design and operating practices will prevent the migration of any hazardous constituent into the ground water or surface water at least as effectively as the design requirements of paragraphs (1) or (3) of this subsection. The State shall not solely or substantially rely upon location characteristics to make any determination under this paragraph. The Administrator may review, on appeal by any person or on the Administrator's own motion, and reverse any determination made by a State under this subsection. The Administrator shall make a decision on any appeal within one hundred and eighty days.

(5) Liner requirements imposed under paragraphs (1) or (3) of this subsection or subsection (c) shall include provisions for quality control and quality assurance with respect to the design and installation of the liners.

(6) Nothing in this section shall be interpreted, construed or applied to require the routine testing of ash which is disposed in a landfill or monofill meeting the requirements of this subsection.

(c) DISPOSAL IN SANITARY LANDFILLS.—Regulations promulgated under subsection (a) may allow disposal of ash from municipal waste incineration units in sanitary landfills with at a minimum one liner, leachate collection and ground water monitoring and otherwise meeting the requirements of revised criteria promulgated under section 4010(c), if (1) such ash is routinely tested and does not fail any criteria under subsection (e); and (2) any fly ash so disposed (including any fly ash combined with bottom ash) has undergone treatment (as defined in subsection (a)) in accordance with regulations for treatment promulgated under this section and such treated fly ash is separately tested and does not fail any criteria established under subsection (e). For the purposes of this section, the mixing of fly ash and bottom ash, or the mixing of such ash with other solid waste, without the introduction of chemical stabilization agents, does not constitute treatment. Ash may not be disposed of in units that are created as a result of vertical expansion of an existing

waste disposal facility unless the owner or operator of such facility demonstrates, and the State finds, that there will be no settling (that would impair the integrity of any required liner) of the waste upon which the proposed unit is to be built.

(d) REUSE.—(1) The regulations under this section shall include such requirements applicable to the reuse and recycling of the ash from municipal waste incineration units, including criteria and routine testing procedures, as may be necessary to protect human health and the environment. In developing such regulations, the Administrator shall consider, to the extent feasible and appropriate, all potential pathways of human and environmental exposure, including both short-term and long-term, to hazardous constituents of such ash from such recycling and reuse. The pathways to be considered shall include, but not be limited to, inhalation, ingestion as a consequence of incorporation of the ash or any hazardous constituents into the food chain, ingestion of potable water or aquatic organisms contaminated by surface runoff, leaching or percolation of such ash or its hazardous constituents into ground water or surface water, ingestion or inhalation of soil particles contaminated with such ash, and dermal contact with such ash. At a minimum the Administrator shall consider with respect to such recycling and reuse, appropriate methods to determine leaching, total chemical analysis, respirability, and toxicity.

(2) Such regulations shall require treatment of ash from municipal waste incineration units before any such ash is recycled or reused to protect human health and the environment. Such regulations shall specify those levels or methods of treatment that, taking into account the potential pathways of exposure identified in paragraph (1)—

(A) substantially reduce the likelihood of migration of ash or its hazardous constituents so that short-term and long-term threats to human health and the environment are minimized;

(B) satisfy any criteria and routine testing procedures included in the regulations under paragraph (1); and

(C) assure that the recycling or reuse of such ash is protective of human health and the environment.

(3) If the Administrator fails to promulgate regulations under this subsection, no person may reuse or recycle ash from a municipal waste incineration unit after the date thirty-six months after the date of enactment of this section unless such ash is treated and leachate from an extraction procedure toxicity test applied to such ash does not exceed standards established pursuant to section 1412 of the Safe Drinking Water Act for any pollutant or contaminant.

(e) CRITERIA AND TESTING.—(1) For the purposes of developing regulations for the management, handling, storage, treatment, transportation, reuse, recycling, and disposal of ash from municipal waste incineration units under this section, the Administrator shall promulgate criteria and testing procedures for identifying the characteristics of ash from municipal waste incineration units that may pose a hazard to human health or the environment. In considering potential hazards to human health and the environment, the Administrator shall consider, to the extent appropriate and feasible, all potential pathways of human or environmental exposure to constituents of such ash, including, but not limited to, inhalation, in-

gestion as a consequence of incorporation of the ash or any constituent into the food chain, ingestion of potable water or aquatic organisms contaminated by surface runoff, leaching or percolation of such ash or its constituents into ground water or surface water, ingestion or inhalation of soil particles contaminated with such ash, and dermal contact with such ash (including, for all such pathways, situations of disposal or reuse). At a minimum, the Administrator shall consider appropriate methods to determine leaching, total chemical analysis, respirability, and toxicity. The criteria and accompanying testing procedures promulgated by the Administrator under this subsection shall reflect the heterogeneous characteristics of municipal solid waste and municipal incinerator ash, including seasonal variations in the constituents of such solid waste and ash. Leaching procedures established under this subsection shall include testing under acidic and native conditions. Test leachate from any ash containing a substance in concentrations exceeding the maximum contaminant level for such substance established pursuant to section 1412 of the Safe Drinking Water Act by a factor of one hundred or more shall, unless the Administrator establishes a more stringent requirement, constitute a failure of the test required by this section.

(2) The Administrator shall, pursuant to subsection (c) or (d), require the owner or operator of any municipal waste incineration unit or any facility handling, transporting, storing, treating, reusing, recycling, or disposing of ash from such unit to test such ash in accordance with the criteria and testing procedures promulgated under this subsection. If fly ash and bottom ash are combined, such combined ash must also be tested in accordance with such criteria and testing procedures, including, as the Administrator determines necessary, the separate testing of bottom ash and fly ash.

(3) Any ash which fails in any characteristic under the criteria and testing procedures promulgated by the Administrator under this subsection shall be disposed of in a facility in compliance with subsection (b) (1) or (3), or shall be treated (as defined in subsection (a)) in accordance with regulations promulgated under subsection (a) and shall be demonstrated to satisfy all applicable criteria promulgated under this subsection before disposal (pursuant to subsection (c)) or reuse (pursuant to subsection (d)).

(4) The Administrator shall seek to validate the criteria and testing procedures established pursuant to this subsection by conducting a program of continuing analysis of leachate produced at facilities disposing or reusing ash from municipal waste incineration units.

(f) Corrective Action.—(1) Whenever on the basis of any information the Administrator determines that there is or has been a release of any hazardous constituent from a facility regulated under this section, the Administrator may issue an order requiring corrective action or such other response measure as the Administrator deems necessary to protect human health or the environment or the Administrator may commence a civil action in the United States district court in the district in which the facility is located for appropriate relief, including a temporary or permanent injunction.

(2) Any order issued under this subsection may include a suspension or revocation of authorization to operate, shall state with reasonable specificity the nature of the required corrective action or

other response measure, and shall specify a time for compliance. If any person named in an order fails to comply with the order, the Administrator may assess, and such person shall be liable to the United States for, a civil penalty in an amount not to exceed $25,000 for each day of noncompliance with the order.

(3) Regulations promulgated under subsection (a) shall require corrective action for all releases of hazardous constituents from any solid waste management unit at a facility seeking a permit under this section, regardless of the time at which waste was placed in such unit. Permits issued under this section shall contain schedules of compliance for such corrective action and assurances of financial responsibility for completing such corrective action.

(g) CLOSURE.—Regulations promulgated under subsection (a) shall establish requirements for the proper closure of facilities treating, storing, or disposing of ash from municipal waste incineration units, for the post-closure monitoring and care of such facilities for a period of not less than thirty years, and for assurances of financial responsibility for closure, post-closure care and corrective action.

(h) STATE PROGRAMS.—(1) Beginning eighteen months after the date of enactment of this section, any State may submit to the Administrator a proposed program for implementation and concurrent enforcement of the requirements of this section which may be considered and approved by the Administrator in accordance with the procedures established in section 4007. State programs approved under this subsection shall contain provisions assuring that each facility receiving ash from a municipal waste incineration unit obtains a permit or other form of prior approval. Whenever the Administrator determines that a State is not enforcing the requirements of this section in a manner equivalent to Federal enforcement, the Administrator shall withdraw the authorization of such State program under this subsection.

(2) Nothing in this section shall prohibit any State or political subdivision thereof from imposing any requirement with respect to the management, handling, storage, treatment, transportation, reuse, recycling or disposal of ash from municipal waste incineration units which is more stringent than any requirement established under this section.

(i) EXPORT.—(1) Export of ash from a municipal waste incineration unit to locations outside of the United States shall be unlawful except as provided in an international agreement between the United States and the country receiving the ash. Any such international agreement shall include at a minimum—

(A) a provision for obtaining the consent of the receiving country prior to shipment of the ash;

(B) a provision that requires tracking of the ash shipment from the site of generation to the receiving country;

(C) a provision for cooperation between the United States and the receiving country on compliance and enforcement of the agreement.

(2) No person shall export ash from a municipal waste incineration unit to locations outside of the United States without a permit or other prior approval from the Administrator to do so. Permits granted for export under this section shall have a term not to exceed five years, shall be accompanied by fees sufficient to offset the cost

experienced by the Administrator in monitoring compliance with the conditions of the permit and shall contain such other requirements as the Administrator may deem appropriate.

(j) Effective Dates.—(1) Regulations promulgated under this section shall be effective upon promulgation, except that requirements promulgated pursuant to subsection (b) or (c) with respect to the disposal of ash from municipal waste incineration units shall be effective on and after the date forty-eight months after the date of enactment of this section.

(2) Beginning eighteen months after the date of enactment of this section and until the effective date of disposal requirements promulgated pursuant to subsection (b) or (c), ash from municipal waste incineration units shall not be disposed in landfills unless such landfills have, at a minimum, one liner, leachate collection and ground water monitoring and otherwise meet the criteria for sanitary landfills issued under this subtitle.

(3) Notwithstanding the provisions of paragraph (2), the Administrator or a State may grant on a case-by-case basis a variance from the requirement that ash from each municipal waste incineration unit be disposed in a facility with a liner, leachate collection and ground water monitoring beginning eighteen months after enactment of this section, on a showing by the owner or operator of any such unit that sufficient capacity to dispose of ash in compliance with such requirements is not available for the unit taking cost into consideration. No variance granted under this paragraph shall extend for a period longer than thirty months after the date of enactment of this section.

(4) Notwithstanding the provisions of paragraph (1), the Administrator or a State may grant on a case-by-case basis a variance from the requirement that ash from municipal waste incineration units be disposed only in landfills meeting the requirements of subsection (b) or (c) beginning forty-eight months after the date of enactment of this section, on a showing by the owner or operator of any such unit that good faith efforts were made to satisfy such requirement but the unit will fail to do so for reasons not in control of the owner or operator of such unit. No variance granted under this paragraph shall extend for a period longer than seventy-two months after the date of enactment of this section.

(5) If the Administrator fails to promulgate regulations under subsection (a) for the disposal of ash from municipal waste incineration units, no person may dispose of ash in a landfill after forty-eight months after the date of enactment of this section unless such landfill satisfies the requirements of subsections (b)(1) or (b)(3).

(k) Prohibition.—(1) Beginning on the effective date of any regulation or requirement under this section it shall be unlawful to manage, handle, store, treat, transport, reuse, recycle, or dispose ash from a municipal waste incineration unit otherwise than in accordance with such regulation or requirement or a State program approved pursuant to subsection (h).

(2) Prior to and after the effective date of regulations under this section, the Administrator may use the authorities of section 3008 to enforce the requirements of this section. In the case of a violation in a State which is authorized to implement and enforce a program under subsection (h), the Administrator shall give notice to the State in which a violation has occurred prior to issuing an order or commencing civil action under section 3009.".

○